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ABSTRACT

This document is comprised of the two 1999 issues of a biannually-published journal featuring research studies, theoretical essays, and classroom practice articles about the development and education of kindergarten children as well as occasional articles concerning preschool and the early primary grades. The spring 1999 issue contains the following articles: (1) "School Play: Education for Life" (Cosby Steele Rogers and Satomi Izumi Taylor); (2) "Sharing, Discovering and Creating: Practice into Theory and Theory into Practice" (Lynda D. Stone); (3) "Multiple Embedded Scaffolds: Supporting English Learners' Social/Affective, Linguistic and Academic Development in Kindergarten" (Suzanne F. Peregoy and Owen F. Boyle); and (4) "The Educational Roots of Garden-Based Instruction and Contemporary Gateways to Gardening with Children" (Arlene Maturano). The fall-winter 1999 issue contains the following articles: (1) "Balancing Constructivist and Instructivist Curriculum Goals in Early Childhood Education" (Lilian G. Katz); (2) "Apple Cutting and Creativity as a Mathematical Beginning" (Elisabet Doverborg and Ingrid Pramling Samuelsson); (3) "Reading Recovery: A Synthesis of Research and Evaluation Studies on Reading Recovery as Early Intervention for Reading Difficulties" (Christine A. Cullen); and (4) "Learning To Move and Moving To Learn" (Robin D. Reese). (KB)

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Violet B. Robinson, Editor

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Vol. 4, No. 1, Spring, 1999

School Play: Education for Life

Cosby Steele Rogers and Satomi Izumi Taylor

Societal changes in modes of entertainment, hurried adult schedules, the lack of safe outdoor play spaces and increased academic pressures on educators and children all contribute to the demise of children's opportunity to develop the whole self through play. Research has documented the importance of play for cognition, creativity, moral development, and emotional well being. This article draws upon the theories of Piaget and Vygotsky to mechanisms through which play enhances development. The article differentiates between free play and the playful curriculum. Free play is under the control of the child and is important for social, moral and emotional development, thus underscoring the importance of recess. The principles are described for developing playful curricula to implement standards of learning by focusing on the context and dispositions of play.

> *Man only plays when in the full meaning of the word he is a man, and he is only completely a man when he plays.* (Schiller, F., 1875, p. 71)

> *Imagination is more important than knowledge.*
> - Albert Einstein

While the old saying "All work and no play makes Jack a dull boy" is important, if we want to have a balanced curriculum, we must also keep in mind its counterpart "All play and no work makes Jill a silly girl." Although the purpose of this paper is to point out that play activities are important to the cognitive, social, physical, and emotional needs of young learners, we strongly advocate balance. Consider, for example, the contrast between imaginative thinking and careful observation of how to perform a skill. Albert Einstein once said, "Imagination is more important than knowledge." It is imagination that gives us our creative technologies, art, music, literature, and solutions to problems. Yet, one cannot create new combinations without knowledge of basic concepts. We cannot combine and recreate things we do not know. Therefore, we must balance the old skills and new skills, work and play, opportunities for imitating as well as creating. However, if we try to dichotomize work and play, we overlook the fact that they are points on a continuum. At one end of the continuum is work (passively following directions with no choice on tasks that are difficult and unrewarding) and at the other end is play (actively choosing activities that give pleasure). Learning experiences can occur anywhere along this continuum, varying in degrees of playfulness according to the amount of action, choice, challenge, change, and joy. Highly skilled educators make teaching an art and learning a joy through balance. They provide work and play, sensitive challenge, choice within limits, following and leading, flexibly enforced

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rules. It is almost as though their teaching is a musical activity--- rhythm (schedule), tempo, balance, repetition, variation, and interesting sounds (actions). Playful teaching is a dance--back and forth. It might be compared to the two-step--teachers lead and children follow, children lead and teachers follow (their interest). Now honor your partner ... and in the words of Sonny Bono, "the beat goes on ..."

In the 19th century the German poet Frederich von Schiller, author of the poem "Ode to Joy" (1875a), wrote that human beings are most human when at play (1875b). When nations can come together to agree upon a set of rules and then carry out a contest with a sense of good will, it is a great joy to the world. Art, music, and literature are often products of play. During the opening of the recent winter Olympics in Japan, there was a simultaneous performance of "Ode to Joy" by choruses from each continent. With highly precise timing (due to infinitely small time delays imposed by via satellite transmission), the choruses joined together in perfect synchrony and harmony. What a joy!!! It is the SPIRIT of cooperation, agreeing on rules, friendly competition, and the joining of skills to create music or games that is the spirit of play. However, if the competition becomes deadly serious, it loses the quality of play and becomes work for the athletes even though the spectators may playfully enjoy the competition. It is the spirit, not the action, that raises us to our highest human potential.

Play not only improves the quality of life of humans, but it also enhances the creativity that leads to innovations. Csikszentmihalyi (1996) used the term "memes" to refer to artifacts that are selected by the culture to be passed on to future generations. Great works of art, social structures, and scientific inventions are among the many possible creations that become memes. Thus, play contributes indirectly to cultural evolution (Bruner, 1976; Smolucha, 1988; Vygotsky, 1987). Both Vygotsky and Smolucha claimed that imagination is the internalization of child's play and is a part of all cultural life, i.e., art, science, and technical creativity. We know that many scientific and artistic achievements have been accomplished by people during times of recreation. Some well-known examples are Albert Einstein (John-Steiner, 1985), Thomas Edison, and Henry Ford, who were known for their creative contributions to society and who were highly playful individuals. Likewise, artists such as Picasso (John-Steiner, 1985) and Salvador Dali were also highly playful. Such contributions would lead us to conclude that educators need to be aware of the importance of their roles in supporting play.

When educators and parents are asked, "What are your goals for children?" they usually reply, "We want them to be healthy, happy, and productive citizens." But, where in the school curriculum is the plan for achieving these goals? Too often the pressure to meet standards of learning for knowledge and skills becomes paramount in the eyes of teachers and administrators who strive to enhance children's performance on tests that demonstrate accountability. Parents, too, want to be assured that their children are making progress academically. Standards of learning are important statements of what society holds to be important enough that it should be transmitted to the next generation. They are essential guides for teachers who impart the knowledge, skills, and dispositions needed for responsible citizenship.

However, implementation of curricula to meet rigid standards can create stress on teachers whose job continuation or salary increases may be determined partially by students' test scores. The pressure from these well-meaning adults is then passed along to the children. To meet high standards for knowledge and skills, the curriculum may become focused only on content rather than on the developmental learning needs of children. One result is often the elimination of field trips, physical education, art, music, and even recess (Jambor, 1995) in favor of more "academic" activities. Another result may be found in increased symptoms of stress that have been observed in the classroom (Burts, Hart, Charlesworth, Fleege, Mosley, & Thomasson, 1992; Burts, Hart, Charlesworth, & Kirk, 1990). But, where are the standards of accountability for emotional well-being and social competence? When developing a curriculum, Katz (1987, 1993) suggested that teachers should adopt at least four types of learning goals, those related to knowledge, skills, dispositions, and feelings. Knowledge includes concepts, ideas, vocabulary, and stories; skills include physical, social, verbal, counting, and drawing; feelings are subjective innate states, and dispositions include curiosity, friendliness, bossiness, playfulness, shyness, creativity, cooperativeness, etc. Katz also stated that "feelings about school, teachers, learning, and other children are also learned in early years....Dispositions are not learned through instruction or drill. Dispositions that children need to acquire or to strengthen...are learned primarily from being around people who exhibit them" (1987, p.1). Play provides children an opportunity to develop all four types of learning goals suggested by Katz.

The National Association of Elementary School Principals and the National Association of State Boards of Education endorse the guidelines for Developmentally Appropriate Practice published by the National Association for the Education of Young Children. One of the basic tenets of developmentally appropriate practice is that children learn best through play (Bredekamp & Copple, 1997). While it is recognized that children can learn in many ways, including under pressure and stress, research demonstrates that learning that occurs in a play environment is more pleasurable and as such promotes a fondness for those learning experiences. This is perhaps why it is so often said that it is through play that children acquire the love of learning.

Since the overall purpose of education is to transmit to younger generations the knowledge, skills and attitudes that promote the survival of the culture and its continuous evolution, it seems pertinent that teachers, parents, and administrators understand that play is an important mode for learning. Many of today's children have had their opportunities for play reduced by excessive television viewing, video games, lack of safe neighborhood playgrounds, and increased academic pressures. We need to restore their opportunities for playful learning in schools as well as for free play and its accompanying social/emotional development. This paper describes the theory and research on play in relation to cognitive development, moral development, and emotional well being. The paper also includes implications for educators such as ways to support play behaviors, to provide the context for play, and to enhance the disposition of play.

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IMPORTANCE OF PLAY

Play is so important to normal development that the failure of a child to engage in play is often viewed as symptomatic of social, cognitive, or emotional disorder. Play has also been linked to creativity and problem-solving ability (e.g., Lieberman, 1977). The role of play in cognitive development has been somewhat more controversial because the role of play in cognitive development has been recognized less than its role in creativity and problem solving. However, Brian Vandenberg (1985) suggested that the value of play may not be so much in its role in cognitive development or creativity but as a main feature of what it means to be human.

Scholars have not yet found a satisfactory definition of play that captures its many dynamic and elusive qualities. Perhaps this is because much of play is in the mind and not readily observable. Nevertheless, the best definition available to us at this time was provided by Rubin, Fein, and Vandenberg (1983) in a scholarly review of the theory and research on play. Rubin et al. provided this definition: " 'play' is a behavioral disposition that occurs in describable and reproducible contexts and is manifest in a variety of observable behaviors" (p. 698). When the components that comprise these three dimensions (dispositions, contexts, and behaviors) are examined in detail, it becomes apparent that it is impossible to separate play from activities that are not play. Instead, we propose that play is an "attitude" or a "way" of experiencing anything. Every classroom experience will be more playful for some than for others. Likewise, some activities will be more playful than others for everyone involved. By using this approach parents, teacher, and administrators can begin to examine their daily practices in terms of their relative degree of "playfulness." Therefore, teachers who wish to incorporate play theory and research into their practices, need only to revise current learning experiences to set the context and support the dispositions that make any learning experience more joyful. The specific criteria for the three dimensions (dispositions, contacts, and behaviors) are described in more detail later in this paper in relation to their implications for educators.

PLAY AND COGNITIVE DEVELOPMENT

Parents and teachers of young children are generally interested in cognitive development and ask two questions: "How does cognition change with development?" and "What influences those changes?" "Do children really learn through play?" There are two views that are useful in answering those questions: Piaget's constructivist theory and Vygotsky's theory of social constructivism.

Piaget's Theory

In Piaget's theory (1952), the dual processes of assimilation and accommodation are used to explain cognitive development. Assimilation refers to thinking or using objects or ideas in ways we already know. Accommodation involves changing our way of thinking due to some new information. Intelligent adaptation involves a balance between assimilation and accommodation, and this is a dynamic process; it involves the simultaneous processes of taking in information and adjusting one's existing ideas/concepts. At times there is more change involved than at others, but at all times both are operating. Assimilation and accommodation are, according to Piaget's view (Piaget, 1970), inseparable. One cannot exist without the other, even though sometimes more change (accommodation) is occurring than at other times.

Piaget (1950/1962) defined play, according to his cognitive framework, as the condition in which assimilation outweighs accommodation. There is more stability than change. New ways of thinking are accepted (accommodation), but the amount of change is minimal. It is in this condition that the old actions or ideas are "played with." They may be repeated again and again as if to master the skill or idea. This is called functional assimilation. Functional assimilation is another term for functional play. The essence of this type of activity is that it is repetitive. This type of play is important when we have just learned a new skill. It is also a way of dealing with stress. For example, repetitive physical activity (swimming, jogging), singing, playing favorite piano tunes or listening to a special piece of music again and again. . . and again. After a stressful day at work, it might be therapeutic to garden, cook, or watch old TV reruns---all repetitive, functional play. No new learning occurs, no adaptation is required, it is therapeutic. In functional play, no changes are made, and the repetitions are carried out numerous times in the same way. For example, Sarah has just learned to print the first letter of her name. She writes "S" over and over as though she can't get enough of the activity. After Mario learned to read a particular story completely through without errors, he wanted to read the same book again and again. After mastering tic-tac-toe, children want to repeat the game as long as they can find a willing partner. After learning a joke, the child may try it out on many people. It is as though once the ability is acquired it must be used, and it gets used on anything or anyone who happens to be available. Piaget called this "generalizing assimilation." In other words, the schema is generalized to other situations, objects, and people. Sometimes it is appropriate to do so and sometimes not. When the schema meets resistance from the environment such as when the object won't fit, doesn't work, or when an idea meets with peer resistance, there is feedback from the environment. The child "discovers" a discrepancy and comes into contact with the reality of the outside world. For example, in the book *Group Games in Early Childhood Education*, Kamii and DeVries (1980) explained that card games enhance math skills by requiring comparison and deciding which of the numbers drawn is larger. A child who believes that "7" is greater than "8" because it looks bigger is quickly challenged by his play partner. The mode is play and assimilation may dominate, but there is change (accommodation) involved. Moreover, because the child is actively engaged in the problem solving, learning is enhanced. Nevertheless, some accommodation has occurred. If, as Piaget proposed, the goal of cognitive development is intelligent adaptation, then the child has grown cognitively.

Using the Piagetian model, cognitive development would be optimized when imitation (reception and change) is balanced with play (using schemes while preserving their form). If play, as Piaget proposed, were characterized by a predominance of assimilation, it would seem at first glance that it would be a less optimal route to intelligent adaptation than accommodation that has proportionately more change involved. The formations that "children learn through play" would seem to be questionable if play constitutes a predominately assimilative mode. Are we now saying that learning does not occur in play? Indeed, not. It is in this arena that the affective components of learning come into focus.

In the assimilation mode, the risks to the self (total embodiment of mind, body, and spirit) in its present form are minimal since little change is required. There is less risk than in the accommodative mode that requires an openness to change. It is when risks are minimal that we are open to change. We are free to try things "this way and that" which is generalizing assimilation and we are free to make "discoveries" in small doses. In contrast, if overaccommodation (imitation) predominates, too much information may come into the system too fast. The system overloads and the result is a "hurried child," to use Elkind's (1981) term. When the system is overloaded, the self is not preserved, and this may result in learners who exhibit high anxiety. Thus, although some learning occurs through imitation, it cannot be incorporated thoroughly without practice and application (functional, recognitory, and generalizing assimilation). The simultaneous dynamic interactive processes of imitation and play promote adaptation. However, low-risk, nonthreatening environments seem to enable one to mobilize energy to be open to try new things in new ways. In Piaget's words, "It would be like gasoline, which activates the motor of an automobile but does not modify its structure" (1981, p. 5). It is then the source of energy, of intrinsic motivation. Thus the playful mode may be the most efficient mode of learning.

Vygotsky's Perspective

Piaget's Russian contemporary, Vygotsky (1978) provides a contrasting but complementary view of the role of play in development. While, Piaget considered play to be a reflection of the child's development, Vygotsky believed that play is a causal factor. In Vygotsky's view, the play activity of the child is more than just recollecting past experiences; it includes a creative recombination of impressions upon which the child constructs new realities that address his or her needs. Vygotsky (1990) stated that children's play is an early form of creativity. Moreover, Vygotsky (1990) postulated that imagination is the basis of any creative activity and is part of all cultural life, including art, science and technical creativity. He distinguished between reproductive imagination and combinatory or creative imagination in that reproductive imagination is closely related to one's prior experiences or memory, while combinatory imagination creates new forms or activities by combining experiences in new ways.

Vygotsky considered imagination to be the internalization of child's play (Smolucha & Smolucha, 1986b). According to Smolucha, Vygotsky's theory of imagination consists of four factors: " imagination develops from children's play, it becomes a higher mental function, in adolescence imagination collaborates with reason, and imagination is an integral part of adult artistic and scientific creativity" (Smolucha, 1988, p. 95). Creative imagination develops from children's play into a higher mental function that can be regulated through inner speech; therefore, the development of inner speech relates to the development of imagination (Smolucha & Smolucha, 1986a). Imagination and inner speech come about as a result of social interactions that are internalized at approximately seven years of age. Smolucha (1988) noted: "A basic premise of Vygotsky's the theory is that all uniquely human, higher forms of mental activity are jointly constructed and transferred to children through dialogues with other people" (p. 36). Thus, children learn pretend play through interacting with adults, and these interactions influence children's development and creative imagination (Smolucha, 1988).

Promoting creativity in children is important to their development and education. Concern about today's increasingly rapid changes in our difficult, unpredictable society has some researchers urging educators to foster imaginative and creative minds in children in order to help them cope (Elkind, 1990, Schweinhart, Weikart & Larner,1986; Singer, 1973). One way for educators to assist in young children's preparation for the difficult adult world is to understand that play is the foundation of imagination and creativity for children. To assist in the development of children's imagination and creativity, teachers need to provide children with ample opportunities to play. They can do this by providing time, objects, a warm climate and the opportunity for children to interact. For example, teachers can provide art activities to children since as Gardner (1973) pointed out "... art is a goal-directed form of play" (p. 166). Through art children are able to represent their emotions, personalities, heredity, and temperament, and, especially through drawing, children can express their feelings, thoughts, and ideas (Eisner, 1982; Kinsey, 1984). In addition, cooperative learning activities (Johnson & Johnson, 1989) might or might not be play; nevertheless, they provide opportunities for peer interaction and active engagement in ways that are more playful than solitary and passive tasks such as worksheets.

Another way teachers can assist children is by teaching in what Vygotsky called the "zone of proximal development." This zone represents the arena in which children can succeed at tasks with the assistance of an adult or more competent peer. The key is in providing assistance to complete a task--- the teaching function, rather than the testing function. The teaching function means that teachers use a "teachable moment" to help children learn new concepts or to think about problems in a new way by carefully phrasing questions, suggestions, or giving warm encouragement. On the other hand, the testing function refers to teachers testing children's abilities during a task by asking questions or giving directions. When children are provided assistance, they are able to perform at a higher level. Later the newly acquired skill can be performed alone. Play is one mode of activity in which children can be successful with minimal assistance. According to Vygotsky, through play the child can stretch to his or her higher level of learning; for example, by pretending to be an older person, the child must consider how older people will act. According to Vygotsky (1978), in play a child always behaves beyond his average age, above his daily behavior; "in play it is as though he were a head taller than himself" (p. 102).

One illustration of teacher assistance in the zone of proximal development was described by Hughes (1999) in his book, *Children, Play, and Development*. Hughes suggested a scaffolding example as follows:

> Becky may play unimaginatively in the block corner when alone, simply stacking blocks and

> then returning them to the shelves, but may soar into flights of fantasy, transforming the blocks into fortresses or castles, when provided with gentle direction by an encouraging teacher. A sensitive teacher will not simply *tell* Becky how to play, but, realizing that a more sophisticated level of make-believe is within Becky's zone of proximal development, will offer suggestions as tools to assist her creative process. The next time Becky plays with blocks, she may reconstruct the experience inspired by her teacher, but in her own imagination, without any external influences or constraints. This according to Vygotsky (1978) is a major function of play. (p. 25)

PLAY AND MORAL DEVELOPMENT

Parents and educators generally agree that in order to be a productive citizen, one must achieve the ability to make moral decisions, even in the face of peer pressure to do otherwise. Play provides a mechanism for developing this moral autonomy, especially through games with rules. Game rules may be either predetermined (e.g., written directions for playing a board game) or agreed upon by the players (e.g., "let's have it so the last one to get a red card is the winner"). Regardless of the source of the rules, children who engage in a game must do so by agreeing to "play by the rules." By subordinating themselves to the rules, children give up spontaneous gratification and thus develop a basic level of morality (Vygotksy, 1978; Berk, 1994).

Symbolic play can also enhance moral development. For example, when pretending to be teachers or parents, children gain understanding of social rules, norms, and behave accordingly (Berk, 1994). The inhibition of immediate gratification promotes self-control. In fact, Vygotsky stated "A child's greatest self-control occurs in play" (1978, p. 99). For example, a group of children were pretending to play "school" in the dramatic play corner. When a "pretend" teacher grabbed a girl's book from her hands, another girl cried, "Teachers don't grab things from children!" The pretend teacher said to the others, "Sorry, I won't do that again, so let me be your teacher, okay?" Berk (1994) summed up this notion of impulse control in the following way:

> From this perspective, the fantasy play of the preschool years is essential for further development of play in middle childhood--specifically, for movement toward game play, which provides additional instruction in setting goals, regulating action to rules rather than to impulse--in short, for becoming a cooperative and productive member of society. Play, in Vygotsky's theory, is the preeminent educational activity of early childhood. (p. 33)

Vygotsky's notion that play promotes children's morality (1987) coincides with Piaget's theory of constructivism described by Kamii and DeVries (DeVries & Kohlberg, 1987; DeVries & Zan, 1994; Kamii, 1982; Kamii & DeVries 1980, Kamii, Clark, & Dominick, 1995; Van Hoorn, Nourot, Scales, & Alward, 1993). In describing the major principles of constructivist education in Piaget's theory, Kamii and others stated that the goal of this educational approach is to foster children's moral as well as intellectual development. According to Kamii and DeVries (1993), Piaget believed that "there can be no moral autonomy without intellectual autonomy and vice versa" (p. 42). Constantly telling children that moral rules are ready made does not promote their moral and intellectual autonomy, but giving children ample opportunities to ask questions, to interact with their environments, and to construct their own knowledge is essential. When playing with their peers, children learn to share, to negotiate, and to follow rules (Kamii & DeVries, 1993). One of the suggestions made by DeVries and Zan (1994) was that teachers can use children's literature to promote children's autonomy. Kamii and DeVries recommended the use of the book "Dr. DeSoto", (Steig, 1982) as a basis for discussion of a social and moral dilemma. Another example can be found in the article by Morris, Taylor, and Wilson (in press) describing the discussion between kindergarten children and a teacher. After this teacher read a book titled, "Amazing Grace" by Hoffman (1991), one of the children commented that Grace could not be Peter Pan because she was a girl; most of the children defended Grace, allying themselves with one child who insisted that Grace could still be Peter Pan although she was a girl. This externally motivated reasoning was based on their experience of seeing Peter Pan being played by females. However, when one girl claimed that Grace could not play Peter Pan because she was black, some children defended her from a more advanced perspective, saying "You can be whatever you want to be no matter what color you are" and "It doesn't matter what color you are." The latter comments indicated that the children were making decisions based on their own internalized thoughts about race. According to DeVries and Zan, "These experiences of perspective taking contribute especially to children's construction of moral judgment" (1994, p.9).

PLAY AND EMOTIONAL WELL-BEING

Play is the best way for children to learn, according to Elkind (1986), because they cannot separate their feelings from thinking, acting, and socializing. Piaget (1951/1962) considered pretense or symbolic play to be an important role in the child's emotional life. Children's abilities for self-expression of language are limited, and their language and words are sometimes inadequate to express their feelings and needs. Adding to this difficulty, children's natural spontaneities are necessarily suppressed through the process of socialization. This is frustrating for children, and symbolic play provides them with an appropriate means of adjusting to reality. They may compensate for their powerlessness by pretending to be powerful (giant, Superman). They might dissolve fears by reenacting a dangerous scene so as to get control of it. They can shape reality to fit their own needs and can act out the conflictual situations of real life through play-- they can "win" even if only in pretense. This serves a cathartic purpose and enhances emotional well-being. In fact, the use of play to relieve emotional conflicts serves as the basis for the field of play therapy.

IMPLICATIONS FOR EDUCATORS

Educators who wish to capitalize on the value of play for development need to give special consideration to the three dimensions of play summarized by Rubin et al. (1983). The three dimensions include the behavior, the context and the dispositions of play. Behavior refers to the nature of the level of the activity. Using Piaget's (1950/1962) levels, the behaviors can be divided into practice play (for example with objects or materials as in science experiments), symbolic play, and games with rules. Other classifications of behaviors might be according to how much social contact is involved--is the child playing alone, beside others, interacting with reciprocal role playing, or joining in a game with negotiated rules. The context dimension of play defines the conditions under which play is most likely to occur. We all know we cannot play when we are stressed but did you know that familiar peers (good friends as opposed to new acquaintances) are essential for higher quality play? The essential elements to support the context for play are delineated below. The third dimension of play, the dispositions, describe the attitude or approach to an activity. In essence, almost any activity can be playful and likewise even games may be work if they are carried out in a seriously competitive manner. Rubin et al. (1983) list the dispositions of play as:

- Intrinsically motivated
- Free of external rules
- Element of pretense
- Process rather than product
- Player rather than object dominates
- Active involvement

The following paragraphs describe ways educators can increase opportunities for playful experiences.

SUPPORTING PLAY BEHAVIORS

To support practice play, time needs to be allowed for repeating newly acquired skills before rushing on to other ones. By observing children's level of interest, teachers can determine when enough practice has taken place. To support social play, observe behaviors, especially on the playground. During free play, the social skills are readily observable. How easily can a child move into a group? Is anyone excluded? One student noticed that Ryan, a second grader, always played alone. When he asked if he could play in a group, they usually said "no." Ryan lacked the necessary skills to observe other children's play and then add something to it or join it in a role that extends the play. For further information on observing development through play, see Johnson, Christie, and Yawkey (1999).

Symbolic play can be supported by providing stories and activities that can be represented through drama. The provision of time and props is important. Some teachers prepare prop boxes that have themes relevant to the curriculum and children's special interests. Myhre (1993) suggested the use of prop boxes to enhance dramatic play and described how prop boxes are helpful in dramatic play, how to get started, where to begin collecting, and how to keep prop boxes in order as well as tips for teachers. One example of a prop box was the gas-station prop box. It would contain work clothes, attendants' jackets, oil rags, oil cans, hats, paper towels, plastic spray bottles, a car tire, toolbox, etc. Abstract rather than realistic props pull for more representational activity that is foundational to reading and writing. Learning to read print involves the gradual process of substituting shapes to stand for words. Since words are sounds that represent the real object or action, the printed letters are rather far removed from what readers are meant to understand. Polly Greenberg summed it up as follows:

"Print is a symbol system twice removed from reality: words represent real things; written words represent spoken words. Very abstract for a young child, but much less so when kept close to direct experiences" (Greenberg, 1998b, p. 77). When children are engaged in pretense, they are using an object such as a block or stick to represent something such as a house or a snake. When they draw or paint, they are creating slightly more abstract representations of the house or snake. Therefore, pretense and art experiences are part of the gradual move toward the use of lines such as sticks and curves that form the letter s in the words.

Petrakos and Howe (1996) suggested that "providing children with an all-purpose vehicle such as a box with a control panel, rather than a designated bus or mail truck may encourage more imaginative play" (p. 74). With appropriate planning of prop boxes, children can cross traditional gender lines and explore possible vocations that might not have been otherwise considered. To incorporate literacy and math activities into dramatic play, teachers often set up scenes that pull for reading and writing---e.g. office, grocery store, or bank. One teacher in a coal-mining region set up an entire coal mine. Kindergarten children signed in when they arrived at the mine to work and signed out when they left. Of course, they have to learn how to read the clock to know what time they arrived at and left work.

Educators can also support symbolic play by linking curriculum to the interests that are played out in drama. This provides information on topics that will hold children's interest as vehicles for meeting the standards of learning. The Reggio Emilia schools in Italy find activities that sustain children's interest by first observing their interests and then extending their involvement. Teachers might use pretense scenarios to embed literacy activities and/or to reflect a particular cultural context. It might be a celebration, a circus, a coal mine, steel mill, florist shop---let your imagination run. Then stop to think of all the literacy and math skills that are used in those settings.

Games with rules can be supported in at least three ways: (1) by providing time to use ready-made board games or games of strategy, (2) by encouraging children to create their own games and rules, and (3) by altering traditional curricular activities to make them into a game. A useful resource for designing games that promote cognitive and social/moral development is Kamii and DeVries's book *Group Games in Early Education* (1980). This book provides suggestions for games as well as a guidance of determining the cognitive value of games.

THE CONTEXT FOR PLAY

After reviewing thoroughly the research literature on play, Rubin et al. (1983) listed these elements as essential for achieving a playful context: (1) familiar peers; (2) familiar interesting toys/objects; (3) freedom within limits; (4) minimal adult intrusion; (5) a comfortable, safe, and friendly atmosphere; (6) scheduling that prevents hunger, fatigue, and bodily stress. Intuitively, then, it seems that we might suggest to educators who wish to provide a more playful context that they implement the practices listed below.

- Design opportunities for children to move about, talk to others, explore materials, try things to see how they work, take things apart.

- Cooperative learning activities promote social competence at the same time they support cognitive growth (See Slavin, 1990).

- Provide more interesting materials and activities and fewer worksheets. It is more playful to learn science by growing a garden than by writing down key words from a book. For ideas on active science experiences, see Kamii and DeVries' (1993) book: *Physical Knowledge in Preschool Education.* Abdi, Taylor, and Freilich (1998) also suggest concrete hands-on science activities.

- Offer freedom within limits. Within the limits of school policies, give choices where possible. When, how, and how much to do something? Choice has been found to promote mastery motivation, as opposed to external motivation (Hauser-Cram, 1998).

- Be happy. Don't hurry. Play can not be rushed. Teachers who rush also diminish the opportunity for active engagement and extended explorative learning (Wien, 1996). Curriculum standards define "what" children are required to learn, but teachers and administrators have a great deal of freedom in determining "how" the curriculum will be implemented. One criterion for a playful context is determined by the opportunity for choices. Choices about specific activities and the level of difficulty to attempt has been demonstrated to increase mastery motivation (Rogers, Ponish, & Sawyers, 1989). Mastery motivation is the label given to the desire to perform a task in order to gain a new competency. The reward is the ability to perform the skill. For example, do you remember how rewarding it felt when you finally mastered some aerobic dance steps or when you learned your way around in a new town? When children learn to write or read their names, for example, they feel good about it. They don't need a check, star, prize, or grade. In fact, research on motivation shows that when such external rewards are used, it undermines the motivation to master something simply for the pride of being able to execute the task (Leeper, Greene, & Nisbett, 1973). Educators who increase the amount of choice and control children have over their own learning are creating more playful contexts and implementing an important principle for increasing motivation.

- Avoid intruding when possible. However, although as Trawick-Smith (1994) advised, "...teachers should respect unique play styles and not tamper too vigorously with them" (p. 12), some children may need teachers' support in their play. For example, Kyle, a three-year-old, needed someone to help him build a tower in the block corner but was unable to find anyone to join him because he did not know how to ask other children. A sensitive teacher would watch Kyle trying to get others to join him unsuccessfully and would step in to assist him by saying, "Kyle, I noticed that you are trying to get other children to help you build a tower, would you like me to help you?" Warm, caring, sensitive teachers know when to intervene and when not to intervene in children's play (Trawick-Smith, 1994).

Although play cannot occupy the whole day since much classroom work includes following specific directions, some time needs to be set aside ---indoors or out--- for totally free play. The restrictions here involve only safety, protection of property, and protection of others' rights. Avoid directing---use the time to observe and make records for narrative reports to parents.

- Many schools prevent hunger and fatigue by scheduling snacks and nap times. However, many are not aware that one of the most stressful activities for a child is sitting still. In some countries there is a recess between each lesson---perhaps an idea worth investigating.
- Almost all educators strive for a warm accepting atmosphere. Its importance cannot be overestimated. A position statement on "Learning to Read and Write: Developmentally Appropriate Practices for Young Children" was published in 1998 by the National Association for the Education of Young Children and the International Reading Association. The document emphasizes the importance of an accepting, nonjudgmental context for literacy development. By providing such an atmosphere, the learning environment can be somewhat more playful. Greenberg (1998a) lists as Principle # 5 for implementing developmentally appropriate reading/writing activities the following: "Children need to become alert to, and interested in language, and the sounds in words, which can be accomplished through meaningful activities and in playful ways" (p. 32).

SUPPORTING THE PLAYFUL DISPOSITION

A disposition can be viewed as both a stable personality trait and as a trait that can be influenced by particular situations. Some people are more playful than others regardless of what they are doing. For the less playful person, the ingredients for the play context might help them be somewhat more playful. The reality is that playful people have their own ideas about "how" to do things and this often does not fit with what the teacher or principal had in mind. They are, in fact, sometimes quite difficult to have in class. For example, Albert Einstein is well known for his rebellion against any authority (Folsing, 1997). He was, in fact, at one point asked to leave school because he wanted to learn in his own way at his own pace. His disposition continued throughout his life, but it was through his ability to imagine ideas which others had not that he was able to develop the theory of relativity that revolutionized the world. In fact, many productive contributions to society come about through resistance to customary practices. George Bernard Shaw once summed it up this way, " The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore, all progress depends on the unreasonable man."

Professional judgment is required to determine just which parts and how much of the playful personality can be expressed at school. How do you separate which classroom behaviors are simply rebellion and disrespect or defiance from those that signal playfulness. Rogers, Impara, Frary, Harris, Meeks, Semanic, Lauth, & Reynolds (1998) developed a trait-rating scale to measure playfulness. A few examples of the statements that are part of the measure are these:

- Always has ideas of things to do
- Uses things his or her own way
- Enjoys learning new skills
- Has fun doing things without worrying how well they turn out
- Pretends a lot
- Has a sense of humor
- Finds unusual things to do with common objects.

While the tendency to employ those behaviors describes playfulness, it does not tell us the direction of the intentions. As all educators know, children can be playfully naughty and rebellious as well as playfully creative. It is not news to experienced teachers that they may find themselves needing to redirect some playful behaviors into constructive, creative activities as opposed to attention-seeking or trouble-making behaviors. The key is to first determine whether the behaviors being observed are playful or hurtful/angry ones. The playful child needs a different type of redirection than does the child with negative emotions.

Here are some suggestions for teachers to support the playful disposition in children:

- Focus on process not product. Encourage risk-taking by not grading or giving points for success. Reward the effort to explore and to try to learn new relationships. This enhances master motivation as opposed to extrinsic motivation (Hauser-Cram, 1998). In one school, the teacher experimented with a simple game of beanbag toss. When children were told exactly how far from the goal to stand, they were much less persistent than when they had a choice of the level of difficulty. When the teacher told them to stand far away from the goal, many children failed to have any success in getting the beanbag through the hole (target) in a large piece of cardboard. These children became discouraged and gave up quickly, seeing that there was little success in store for them. When other children were told to stand very close to the target, they had almost 100% success. This was too easy and they became bored and quit very quickly. However, when children had a choice, they challenged themselves to see how far they could go. Since they were not being graded or earning prizes (external rewards), they were not motivated to achieve 100% success. Hence, they tried to find just how much they could improve their skills. It seems reasonable to suggest that the same principle can be used in classroom assignments. Some teachers use "contract" spelling assignments in which children choose how many words and the level of difficulty of words they will take in the next spelling test. This reduces the risk of total failure, or the boredom of total success. However, it operates only so long as the student is being rewarded for effort--not the mere number of words spelled correctly.
- Give choice to promote mastery motivation.
- Use active learning experiences whenever possible. Again, cooperative learning provides opportunity for active engagement. An excellent resource for active learning projects is Katz and Chard's (1989) book *Engaging Children's Minds: The Project Approach*.

CONCLUSION

Because of the importance of play's contribution to different aspects of human development, Stone (1995) urged early childhood educators to be advocates for play, stating that knowing the definition of play, the types of play, and the benefits of play empowers teachers to be "advocates for play" (p. 50). In accordance with Stone, Jambor (1995) strongly supported the importance of school recess as a time to develop social skills through play. Teachers can do the following to emphasize the importance of play to everyone involved in educating young children:

1. Involve parents in school play activities (Jambor, 1995; Stone, 1995). For example, inform parents of the importance of play by sending a class newsletter, or involve them in creating prop boxes or in inviting them to join in the children's play.

2. Educate administrators and faculty (Jambor, 1995; Stone, 1995) by providing them with articles that emphasize the virtues of recess and play which will strengthen teachers roles as play advocates.

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Sharing, Discovering, and Creating: Practice into Theory and Theory into Practice

Lynda D. Stone

This article suggests that teachers' identities are socially constructed as competent in practical knowledge but not in formal theoretical knowledge about teaching and learning. It is argued that the social and historical distinction between theory and practice has also contributed to teachers' identities as primarily practical. This identity has limited teachers' development and deeper understandings of the relationship between teaching practices and educational theory. A transformation of teachers' identities from solely practitioners into teacher-researchers is offered as a means to promote better understandings of the reciprocal relationship between theory and practice. Teacher-researchers have the potential to redefine research questions and influence educational theory. An example of a university and elementary school collaboration is given and shows that instructional practices and formal theories are in a reciprocal relationship.

> *What we have to learn to do we learn by doing.*
>
> \- Aristotle, *Ethica Nicomachea II* (c. 325 B.C.)

> *It may be that education can only take place when we can be the friends of one another's minds.*
>
> \- Maxine Green, 1991

In the boisterous, lively and, at times, turbulent life of classrooms, educators develop practical knowledge about teaching and learning. An activity as delightful as reading Maurice Sendak's amusing story *There's a Nightmare in My Closet* to young children creates a rich environment for teachers to discover what works and what does not. At times, children listen with quiet intent and at other times they giggle, talk, or fight among themselves. What creates children's range of responses to storybook reading? What motivates children to pay attention? What kind of stories are better to read when children are restless and fidgety? These are but a few of the questions that can potentially arise during common classroom activities. Where do answers to these questions come from?

In this paper, I suggest that solutions to daily problems reveal how teachers' identities are socially constructed through shared stories about practical understandings of teaching and learning. I argue that teachers' knowledge includes a mixture of practical and theoretical understandings. Their theoretical knowledge is a combination of formal and informal theories. Formal theories are explanations of teaching and learning derived from research and translated into curriculum and instructional guides. Informal theories, also explanations of

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teaching and learning, are a complex blend of teachers' past experiences, hunches, intuitions, and formal theory. Informal theories, however, are not recognized as theories but as practical understandings of teaching and learning. Teachers share their practical understandings through stories about children, daily problems, and possible solutions. It is these shared stories, I argue, that contribute to teachers' identities as practical beings as well as limit their deeper understandings of theory-practice connections. The social construction of teachers' identities influences teacher development in the context of schools and creates cultural expectations for specific behaviors and responsibilities. The reframing of teachers' identities as teacher-researchers is offered as one possible approach to creating circumstances in which teachers can develop better understandings of the theory-practice connection and contribute to the field of education. To follow this argument, let us return to the question, "Where do teachers find solutions to everyday problems?"

Relevance of Practice

Most solutions to daily problems, many teachers agree, are not to be found in university courses, in-service trainings, or talks with administrators (Lortie, 1975; Shimahara & Sakai, 1995). For these teachers, answers to everyday problems come from talks with colleagues, from trial and error experiments, from accidental discoveries, and from creating novel strategies. Solutions that teachers create and recreate in response to their daily problems produce procedures and daily routines or "rules of practice" that are used to guide instructional decisions (Elbaz, 1983). Schon (1983) suggests that this on-the-go knowledge production is a form of "reflection-in-action." He argues that insights, strategies, and practices arising from the chaotic and calm moments of classroom life is a form of "nonpropositional" knowledge, that is, understandings without the logic and systematism, of theoretical knowledge.

The belief that teachers' knowledge is fundamentally practical is shared by teachers and researchers alike (cf. Lampert, 1985; Lortie, 1975). Jackson (1992) argues that the press of classroom life to find immediate and workable solutions promotes the development of practical knowledge. Most teachers would agree that praxis, in the form of useful routines, is the kind of knowledge most needed to be successful in the classroom. Not unexpectedly, it is common for many educators to point out the value of practical knowledge and the limitations of theoretical knowledge. Clearly, there is a historical, even common sense, foundation for believing that practical knowledge is one of the defining characteristics of teachers.

Teachers' beliefs and understandings, however, are not a simple combination of heuristics, skills, and strategies. There is a large body of evidence that documents the nature of teacher knowledge as a complex, integrated, and coherent functioning system (Fenneman & Loef, 1996; Leinhardt & Greeno, 1986; Thompson, 1996; Shulman, 1986). The contents of teachers' functioning systems are a combination of knowledge (practical and theoretical), beliefs, and past experiences mediated by continually growing understandings of academic content, pedagogy, and learning. Teachers use their functioning system to interpret and reinterpret events, imagine solutions, plan strategies, predict behaviors, and evaluate events across a range of different activities. According to Webster's dictionary, a theory is systematically organized knowledge, applicable to a wide variety of circumstances, used to analyze, predict, or otherwise explain the nature of behavior. Teachers' coherent and integrated body of practical and theoretical knowledge, then, is theoretical knowledge to the core. Given that teachers do have theoretical knowledge, how is it related to their practical knowledge?

Practice into Theory

What teachers know and believe, that is, their cognitions, guide their actions and thoughts. Their thoughts come into existence in the context of purposive, socially meaningful activities. For example, discovering a strategy that helps a frustrated child figure out how to write or draw a story one day functions as a tool for reflecting on or guiding other children with similar problems another day. Teachers' practical knowledge develops from thinking in action and from repeated experiences of thinking in action. Teachers reflect on these repeated experiences to draw conclusions about what works and what does not. In a sense, teachers' development of practical expertise is a process in which "the head replaces the hand" (Scribner, 1988). In this way, practice turns into a type of theory.

Teachers' more general explanations of learning and pedagogy derived from this type of theory function as an integrative system that teachers use to make decisions for both in-the-moment and future events across a range of tasks. This integrative system is abstracted, in part, from repeated experiences with particular children and events. The process of abstracting general characteristics from the particulars of experience is similar to what researchers do in case-based investigations. Case studies are focused on in-depth studies of individuals, events, or issues. These studies involve researchers spending a significant amount of time observing and participating with individuals in their everyday routines. Patterns found in these observations are interpreted and turned into generalizations about behavior (Stake, 1994). To the extent that teachers are collecting participant observation data and reflecting on a range of patterns, it is possible to say that they are not only theoretical but also emergent researchers. Of course, the research skills that teachers begin to develop do not fully materialize--a topic to which I will return later. In any event, teachers do develop practice-based theoretical understandings about children in the context of the classroom. If, then, theories do develop from teachers' practical experiences, what kinds of theories develop?

Practical Knowledge as Informal Theories

The theoretical knowledge that emerges from teachers' local, case-like studies is a type of informal theory. Informal theories are intuitive to the extent that they are not formalized, self-aware cognitive activities (Carey, 1996). These informal theories are made up of problem solutions and understandings of daily teaching experiences that are generalized to solve problems across a range of learning activities. For instance, from multiple experiences of teaching (and learning from) lessons on phonemic awareness and vocabulary comprehension, teachers develop insights about how to ask questions, about what strategies help children's comprehension, and about when to encourage or when to provide in-depth explanations. Teachers can use these understandings across academic areas, for example, helping children read mathematics problems or science books. For this reason, as teachers experience, talk about, and reflect on regularities or repeated patterns found in behavior, they develop informal theories about how children learn, about instructional strategies, or about motivational processes. In other words, teachers use their prior experiences with patterned behaviors to solve in-the-moment problems and to develop a course of action for future dilemmas. As new solutions are utilized, problems emerge. These experiences in turn lead to new understandings about what works and what does not in practical activity. Informal theories arise from an interaction of teachers' beliefs and prior knowledge, theoretical and practical, with their day-to-day endeavors. Teachers' informal theories, then, are theorylike explanations that represent causal relations derived from practical experiences with teaching. Teachers' knowledge, and for that matter, everyone's, is a complex interaction of practical and theoretical understandings--both formal and informal. That is, theoretical knowledge and practical knowledge are in a dialectical relationship. Why is it, then, that teachers' knowledge is framed as only practical?

One reason is verification. There is generally no formal documentation of teachers' growing knowledge base in their local institutions. Consequently, emergent understandings are neither systematically examined by the local community nor accepted as being theoretical. These characteristics of informal theories distinguish them from formal theories, which are written, shared, and critiqued by a larger community. Nonetheless, teachers' informal theories tend to remain stable when they are supported by future reoccurrences of similar events and shared with the local community. When teachers share and produce knowledge with their colleagues, a form of social verification occurs. Knowledge produced through social verification processes is resilient to change and regulates behavior (Hardin & Higgins, 1996). Not surprisingly, teachers' informal theories have a powerful and far-reaching influence on educational practice and teachers' identities as practical. What is it that makes informal theories so compelling to teachers? How do these informal theories contribute to teachers' identities as practical?

From Narratives to Informal Theories

The answers to these questions have to do in large part with the transformation of practical knowledge into shared informal theoretical knowledge. When teachers share what they know with colleagues, parents, and friends, their knowledge is framed as practical insights derived from firsthand experience. Teachers tell stories, stories of frustrations and disappointment about what did not work and stories of joy and accomplishment about what did work (cf. Connelly & Clandinin, 1990; Nelson, 1993). Stories are deeply appealing. They endow experience with meaning by linking the vicissitudes of daily life into cohesive, believable wholes (Bruner, 1991; Sarbin, 1986). The interesting aspect of teacher stories, and narratives in general, is that they are coconstructed

(Goodwin, 1984). In other words, narratives are not solely the product of the storyteller. Narratives are a way to replay experience (Goffman, 1981). This reexperiencing is coproduced by the audience as they insert their thoughts, feelings, and ideas into the replaying. The audience relives the experience vicariously with the storyteller and in reliving this experience they interject their own interpretations about the shared story's "real" meanings. An audience's interjected interpretations of the story are a form of theory-building activity in which participants negotiate among different views about how the world functions (Ochs, Taylor, Rudolf, & Smith, 1991). These negotiated interpretations are the means by which teachers interactively come to a shared understanding about life in the classroom and children. Moreover, coproduced stories are one of the ways that we actively shape each other's knowledge and reasoning processes. For this reason, teacher storytelling becomes a distributed form of cognition "stretched over mind, body, [and] activity" (Lave, 1988, p. 1). Shared stories also become, over time, reliable and relevant prescriptions for action; they affect teacher decision-making processes. Storytelling, then, is one of the primary processes by which an individual teacher's practice is turned into local theoretical knowledge shared and valued by the community. Albeit, shared stories are not considered to be related to formal theoretical knowledge by participants.[1]

Given our growing appreciation for the complexity of teachers' understandings and knowledge production processes, why is it that the ethos of teachers-as-only-practical continues to dominate discourse in local schools and in many universities? Why do teachers themselves continue to eschew research-based theories as thinking tools when they are eager to use informal theoretical knowledge of their colleagues? The complex and intriguing answers to these questions are found in our social and cultural history and in our daily practices.

Social and Historical Construction of Teachers' Identities

Cultural practices are produced by what we say (discourse) and what we do (practices). These practices include such everyday routines as reading books to children, telling stories about our past experiences, or eating in the lunchroom. Culture, from this perspective, includes both the stable aspects of culture and the dynamic aspects that emerge from active participation in daily events. For example, we think of storybook reading as common to all early childhood classrooms; it is a stable aspect of classroom cultures. What specifically happens as teachers and children read books together varies both within each classroom and across classrooms. This is the dynamic aspect of culture; it is locally situated and emerges through social interaction. Participation in practices produces, reproduces, or potentially transforms a culture (Goodnow & Miller, 1995). As a case in point, a teacher's lunchroom story of a personal experience with a child produces and possibly transforms local culture. A teacher's story of failure with a child who has a past history of failures is a confirmation of a shared understanding that both produces and reproduces the local culture. In contrast, a story shared about the success of a lesson with a child who has a history of repeated failures can potentially change other practices or how this child is treated in the future. In either case, the teacher is producing and reproducing a cultural practice of sharing experiences in the lunchroom.

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[1] In this paper, I am not suggesting that narrative and theoretical or paradigmatic thought can be equated; they have different rules of verification and different standards of evidence. However, following Bruner (1986), I argue that they both exist side-by-side. Further, I contend that a portion of teachers' formal theoretical reasoning begins its development in narrative thought.

Cultural practices, such as storybook reading or lunchroom conversations, also reflect what we find desirable and acceptable. Practices index our values (what we think is or is not important) and our beliefs (what we think is valid and true). For example, lunchroom conversations, common to most institutions, come with expectations or beliefs about how to participate and what should or should not be included (Cherryholmes, 1988; Miller & Goodnow, 1995). In many school lunchrooms, talking about classroom experiences is an acceptable activity. Discussing individual children is acceptable. Evaluating past experiences with a group of peers is acceptable. Talk in these routine activities shapes and encodes what we think, what we value, and what we believe. Similarly, our views about teachers, their knowledge, and their roles, i.e., teachers' identities, have been constructed in our cultural practices through social interaction. Lunchtime stories in schools are also contexts where teachers tell stories about who they are, that is, their identities. Self-stories play a crucial role in shaping intellectual and social development (cf. Eisenhart, 1995). Accordingly, teachers' stories contribute to their own identities as practical. However, the social construction of teachers' identities as primarily practical is not a simple process. All participants are actively engaged in the production of selves and possible selves (Bruner, 1986). Self- identities as a social construction, occur across a range of cultural practices. If our cultural practices have constructed teachers' identities as fundamentally practical, how has this happened?

In education, our historical discourse created a theory/practice distinction. In this distinction, theory is systematic, objective, disinterested, generalizable and scientific (Suppe, 1977; Cherryholmes, 1988). In contrast, practice is less systematic, subjective, situation specific, and nonscientific. Theory is framed as more valuable, at least by academics and researchers, because it can be used to describe, control, and predict (Cherryholmes, 1988). Formal theory, in education, is expected to provide systematic procedures for creating effective teaching practices. This view explains why educational documents such as curriculum guides and reading programs have been interpreted through the lens of fidelity (Elmore & McLaughlin, 1988). That is, teachers are expected to follow curricular or instructional guidelines closely. Put simply, the closer teaching practices matched formal theory, the better the implementation of the theoretical frame. The underlying assumption of a fidelity approach is rooted in the Enlightenment tradition and its concern with exactness and rational control (Cherryholmes, 1988). This tradition combined with a

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transmission view of knowledge[2] cast teachers as passive receivers of knowledge rather than producers of knowledge. Scripted curriculum or other "teacher proofed" curriculum guides are products of the fidelity approach (Beyer & Apple, 1988). Clearly, this approach implies that teachers have the practical skills to turn curriculum into meaningful teaching events but not necessarily the theoretical/research skills to critique or reshape the curriculum. Not surprisingly, teachers often use these guides and curriculum materials to treat children in a similar manner: as knowledge receivers rather than producers.

To contribute to the complexity, much of the research that has historically informed teaching practices was conducted in laboratories or highly controlled situations.[3] Neither problems of laboratory- derived theory for instructional practice nor the ecological validity of this research was a common topic of talk or investigations. In schools and classrooms where teachers were using instructional and curriculum guides, they were communicating their understandings of these materials utilizing language filled with rich and colorful (and frustrated) references to personal experiences and local constraints. The discourse teachers used to communicate their understandings marked them as concerned, caring, or practical but not theoretical, rigorous, or disinterested. Through talk, stories, and musings, teachers framed practical knowledge as valued and included it. They framed formal theoretical knowledge as pointless, unproductive, and excluded it. The values and beliefs indexed in teachers' talk became part of their collective memory--a stable component of their local culture. In contrast, the talk among researchers, professors, and policy analysts included stories and evaluations of how closely teachers were aligning or not aligning their practices to guidelines, which reflected formal theoretical positions. In this case, formal theoretical knowledge was valued and included in the discourse while practical knowledge (qua situated understanding) was devalued and excluded. What was said and what was done in university and local school meetings, in conferences, and in classrooms, contributed to the distinction between theory and practice (Cherryholmes, 1988).

These historical discourses shaped how teachers, administrators, and researchers conceptualized the theory-practice distinction. These conceptualizations were encoded in talk, actions, and beliefs. The distinction itself became a conceptual tool for guiding our own thinking and interpretations of everyday events and interpretations of our own identities. Practical knowledge and theoretical knowledge were defined as distinct categories. Formal theoretical knowledge and its production were in the hands of researchers and universities. Teachers, parents, and administrators, on the other hand, had the inside track to practical knowledge. This either/or distinction between theory and practice constrained our understandings of how teachers create hypotheses or explanations about teaching and learning. These distinctions also sustained the belief that teachers are fundamentally practical.

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[2] A transmission view of learning assumes that the environment is the source of knowledge. Through repeated experiences, people's knowledge reflects the environment with growing accuracy (Saxe, 1991). From this perspective, the child or adult is passive and shaped by an active environment.

[3] The history of education in the United States is filled with a range of reform efforts that were not necessarily informed by laboratory research or controlled experiments (c. Dewey, 1902). However, the most pervasive influences on educational practice originated in behaviorism and experimental research (Doyle, 1992; Lagemann, 1989; Shulman, 1970). There was a strong belief that laboratory research on psychological processes and their development could be used to create better instructional practices.

If historical discourse practices depict teachers as solely practitioners, is it possible to change this view to a more complex portrayal? Would a better understanding of how teachers construct and use formal and informal theoretical knowledge change teachers' identities? If teachers themselves develop different identities will this create possibilities for changes in teacher roles and instructional practices?

Emergent Understandings of Learning and Cognitive Development

Solutions to complex problems are seldom, if ever, simple. Social and historical practices of the past exert a strong influence over our present views. Nonetheless, changes can and do happen. In education, and the social sciences in general, a sea change has been occurring in the last twenty years. There is a growing recognition that psychological processes are promoted through and by practical activity. The things we do everyday, how we teach a lesson (Serrano, 1996), how we participate in dinner conversations (Ochs, Taylor, Rudolph, & Smith, 1992), and how we work (Scribner, 1984) promote our intellectual development. The cultural tools that we use in our daily practices (e.g., narratives, informal theories, curriculum guides) mediate how we think, act, and talk. As a consequence of these emergent understandings of development, historical descriptions of cognitive processes as solely in the head are being replaced with the idea that doing is knowing (c. Hutchins, 1995; Martin, Nelson, Toback, 1995; Resnick, Levine, & Teasley, 1993; Scribner, 1988; Wertsch, 1998). These new understandings about the nature of knowledge and about how we learn are changing our conceptualizations about everyday experiences, about knowledge production, and about practice and theory. Studies into learning and development once conducted primarily in laboratory settings are moving into the everyday world--classrooms, factories, and homes (c. Engestrom, 1999; Nunes, Carraher, & Schliemann, 1993). Educational psychologists, developmental psychologists, and teacher researchers are working to find ways to model everyday practices to discover how our routine activities shape and structure growth and development (cf. Brown, 1992; Miller & Goodnow, 1995; Stone, 1996). It is in the everyday practices of the classroom and routine conversations at schools that teachers' practical and theoretical knowledge develops. We are coming to realize that a deep understanding of education can only be achieved through an in-depth analysis of classrooms and schools--by researchers and teachers.

Along with the recognition that learning and development occur as part of our daily lives, we are also coming to understand that knowledge is socially constructed (Cole, 1985; Dewey, 1916; Mead, 1934; Ochs, 1988; Rogoff, 1990; Vygotsky, 1978). Teachers, researchers, parents, and children are all actively engaged in the production of knowledge; it is not simply transmitted. How we produce our understandings is complex and interrelated with the social world. Informal theoretical and practical knowledge are promoted through and arise from our own personal and practical understandings of the world, for example, our stories and how we share these stories with others (Bruner, 1986; Pennington & Hastie, 1991). For this reason, our informal theoretical knowledge and our moment-to-moment practices are intertwined and woven together. From these insights, we come to realize that teachers are meaning makers who produce complex understandings in the context of meaningful activities. Asking teachers to implement a reform effort without a recognition of their knowledge construction processes is wrong headed. To assume that teachers do not have theoretical knowledge is to be blind to the complex processes of cognitive development. What teachers know about children, learning, and teaching is produced in the contexts of practical activity in classrooms, playgrounds, and lunchrooms. These experiences are turned into practical and informal theoretical understandings in a recursive and interactive process. This iterative process, however, is not removed from formal theories found in curriculum guides, research articles, and university courses.

Formal theories do make their way into classrooms. They are a part of teachers' prior knowledge; teachers have appropriated various aspects of formal theory. It is often the case, however, that formal theories are cast as practical pedagogical knowledge. That is, formal and informal theories are an implicit part of instructional practice. For example, the use of praise to increase desired behaviors and promote self-esteem is a common and widespread practice. It makes good sense to teachers to praise children for accomplishments. It works--generally. Teachers have a wealth of experiences to confirm the benefits of praise. To the extent that praise is cast as reasonable and the right thing to do, it is seen as a dimension of practical activity. Nonetheless, the theoretical constructs underlying the use of praise were researched and formalized by reinforcement theorists (Baer, Wolf, & Risley, 1968; Skinner, 1974). For this reason, when teachers utilize reinforcement techniques, they are implementing both formal and informal theoretical constructs.[4] The connections between theory and practice, however, remain implicit.

It is this implicit relationship between theory and practice that is problematic. When teachers are unaware that their actions are driven by informal and formal theoretical knowledge and personal confirmations of this knowledge, their opportunities to reflect on and critically evaluate theory-practice connections are seriously constrained. This situation is not trivial. Without opportunities to reflect on and change practices in a systematic and deliberate way, practices will be reproduced. Consider, for example, two common classroom teaching practices: praising and helping. Utilizing attribution theory, Graham (1990) found that unsolicited help such as praise acted as a low-ability indicator for older children (8 to 12 years old) but not for younger children (4-5 years old). In other words, when teachers provided unsolicited praise, children's developmental level influenced how praise was interpreted. In a later study, Graham and Barker (1990) found that unsolicited help during the initial stages of problem solving led children of all age groups (5-12 years old) to infer low ability. That is, when a teacher gave help in the form of hints or cues during the first steps of problem solving, children attributed this to low ability. Children's attributions of low ability have serious consequences for achievement and motivational processes. Praising and helping children in learning settings are widespread and common strategies. Implicit theories, formal and informal, guide the use of these strategies. In moment-to-moment activity, teachers see a range of children's responses to these strategies. The variation in children's responses are opportunities to examine practice-theory connections. However, when theoretical aspects of practice are implicit, teachers are left without systematic means to reflect, evaluate and critique the complexity of utilizing praise and help in the classroom. Practical knowledge appears divorced from theoretical. The result will be the reproduction of practice. If implicit theories do not offer a means for teachers to reflect on their practice, how is it that more explicit theories open up new avenues for reflection and potential transformation of practice?

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[4] Japanese teachers do not use praise or reinforcement techniques in the pervasive way that U.S. teachers do. Consequently, the use of praise in U.S. classrooms is not a universal practice across cultures (Stevenson & Stigler, 1992).

When theories are framed as thinking tools, that is, tools to help us assess practice, tools to mediate what we do, they become a resource for reflection and evaluation rather than fully defined guides to practice. When teachers have opportunities to frame informal and formal theories as tools, they can also use their situated understandings of children to respond to the complexities of local conditions and reflect on possible future responses. That is, informal and formal theories can be in a conversation with practice. For example, Stone's (1994) study of problem-solving discourse in a bilingual kindergarten classroom revealed that a teacher's growing understandings of social constructivism created opportunities for changed practices. Social constructivism holds that complex psychological skills are first promoted during social interaction and later appropriated by individual children (cf. Vygotsky, 1978; Cole, 1996). The teacher in this study, Ms. Fogarty, worked with the researcher and other practitioners to make explicit her views about learning and development. She recognized that many of her practices were informed by a transmission model of learning in which the teacher was the primary producer of knowledge. After reflecting on her instructional practices, Ms. Fogarty decided to create situations in which children were actively contributing to ongoing activity, that is, coconstructing knowledge. Over the course of a year, this teacher provided opportunities for children to display their thinking strategies as well as to share in the decision making. How Ms. Fogarty created opportunities for children to participate in these activities is captured in the excerpt below. This excerpt is taken from a phonics lesson in which children were expected to determine the initial consonants of words in both oral and written forms. To help make this activity meaningful, Ms. Fogarty displayed pictures that children were familiar with from an earlier literacy activity.

Explaining Strategies: Phonics Lesson in a Kindergarten Classroom[5]

Teacher	We just chose a picture. Now based on this picture that Angela chose we need to come up with a word that we want to say. Veronica, what's your idea? What do you see in that picture?
Veronica	Family.
Teacher	O.K. Fa::mi::ly::. What letter does that start with?
Students	Gee! "Ef::"
Teacher	Which one is *f*? Somebody said *f*.
John	Right there by *e*.
Teacher	Right there by *e*. John's giving you a strategy. It's right there by *e*. Do you know *e*?
Student	I do.
Teacher	O.K. Who has another strategy for Veronica besides just pointing to it? How would you figure out where *f* was if you couldn't figure it out?
Student	I know.
Teacher	Julio.
Julio	By the abcdefg.
Teacher	Oh::. You'd say the whole thing. A::B::C::D::E::F::
Antonio	Ef::. That's what I'd check.
Teacher	What was the letter we were looking for? (Stone, 1994a, p.19)

In this example, after a query from the teacher to select a picture, a young student, Angela, volunteered to pick the picture for the group. Another volunteer, Veronica, identified the picture as a *family*. Ms. Fogarty, enunciated the word *family* slowly so that all of the children could hear each of the discrete syllables. Next, the teacher poses the question, "What letter does that [the picture] start with?" The teacher's query was followed by students explaining and sharing their strategies for solving this phonics problem. The organization of this lesson is not typical for many kindergarten lessons. There are two salient attributes that distinguish this particular lesson from more typical instruction. First, children make decisions and choices. These choices and decisions are embedded in the moment-to-moment activities within the lesson. The second distinguishing feature is the fluid shift of the expert role between the teacher and the students. This shift results in young children taking on a more central role in the production of knowledge, that is, sharing strategies. The opportunities children have to explain their thinking with others serves as a potential moment

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[5] Transcription conventions used in Stone's study were developed by Gail Jefferson, (see Atkinson & Heritage, 1984). Specifically, ( ) indicates unclear speech; (.) are untimed pauses; °xx° is quiet talk in relation to surrounding speech; [refers to simultaneous start ups or overlaps; :: specifies extension of sound.

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of cognitive growth. Further, after many experiences of making within lesson choices in this kindergarten classroom, children began to direct many aspects of their own learning. That is, they became self-regulated learners over the course of the year.

Ms. Fogarty's practice of expecting all students to coparticipate in teaching activities was a direct result of her experimentation with formal theories and her examination of informal theories. The tensions of trying out new practices in the face of ambiguity, conflict, and uncertainty became an important part of the conversations between Ms. Fogarty and the researcher. Through these conversations, both participants were challenged to consider each other's understandings and dilemmas--both participants were learning. Conversations about instruction and the practical meaning of theories became a weekly routine; the culture of schooling for this teacher was in the process of transformation. As this cultural transformation evolved, Ms. Fogarty's self-identity also evolved from a teacher who consumes knowledge to a teacher-researcher who produces knowledge. Ms. Fogarty did have complaints. She felt that the outside requirements of her school and the school district limited the amount of time she could focus on collecting data and evaluating her own discourse practices. Traditional school cultures do not make it easy for teachers to take on new identities or new roles. Nonetheless, Ms. Fogarty went on to work collaboratively with other teachers in the district to discuss and reflect on the practice-theory connections; that is, she went on to change a portion of the school's culture. Although Ms. Fogarty continued collaborating with the researcher, she also became self-regulated. That is, she continued to grow as a researcher-practitioner.

Ms. Fogarty's example is critical to understanding the relationship between theory and practice. This teacher's reflection on pedagogy in relation to informal and formal theories mediated her thinking processes and teaching practices. She was able to use her in-the-moment understandings of the complexities and conflicts that naturally arise in classrooms to make sense out of how formal theories can provide insights into practice. Similarly, she was also able to see how some of the unique aspects of her practices could inform theories. In this way, Ms. Fogarty's instructional practices and formal theories were in a reciprocal relationship. This reciprocal relationship provided opportunities for productive growth of instructional practices--the context of children's learning and developmental processes (Stone, 1996; Stone & Fogarty, in progress). What makes the ongoing conversation between theory and practice so crucial is related to the inherent weaknesses of each. When formal theories are not considered through the lens of practical knowledge, they are fruitless in promoting better understandings of teaching. Formal theories are generalized descriptions of normative practices. They do not address the idiosyncrasies and complexities of daily activity that constrain some types of activity and afford others. For this reason, when formal theories are not in conversation with practical activity, they are brittle and useless (Cherryholmes, 1988). On the other hand, when practical knowledge is not systematically reflected upon, it leads us to repeat what we have done without the opportunity of change. Dewey (1929) called a reliance on practice as the sole source of knowledge the "bondage of habit which is always closing in on us, restricting our vision of what is and of what the actual may become" (p. 298). If the practice-theory connection is so important, what can we do to promote it given the circumstances of teacher's daily lives in schools?

Promoting Theory-Practice Connections

Making the practice-theory connection an ongoing part of teachers' lives in schools is not easy. The institutions in which teachers work do not generally support the collaborative conditions necessary for reflective conversations about learning and instruction (Florio, 1983). What made this possible in Ms. Fogarty's example was her own interest in teaching, a supportive administrator, a collaborative researcher, an adequate amount of time for discussion, and access to current research findings. In a sense, this teacher, the administrator, and the researcher became an intellectual community, that is, "friends of one another's minds" through stories about theory, practice, and the struggles and joys of teaching. Ms. Fogarty's involvement in this research endeavor, in this intellectual community, had positive consequences for herself, her students, and the larger community. Such benefits make teacher involvement in research and reflection a very desirable goal. If participation in a teacher-researcher community promotes better understandings of theory-practice interconnections, how can individual teachers create the circumstances for their own development?

There are a number of ways that teachers can create their own intellectual communities where practice and theory are in conversations. This paper offers a description of one possible option, a university-teacher collaboration; however, for information on other alternatives see Liberman & McLaughlin (1992), Pine (1992), or Wong (1994). Creating a thriving intellectual community requires support and resources--from both inside and outside the local school. Developing a partnership with a local university is one way to gain such support. The exact nature of the support and resources gained from a collaborative effort can be negotiated by local participants. However, one of the main benefits of a university-teacher collaboration is participation in what Rorty (1980) calls "edifying" conversations, which have as their goal continued reflection-in-talk "rather than ... find[ing] objective truth" (p. 377). Collaborative conversations are the means by which we become "the friends of one another's minds" and promote each other's intellectual development. However, edifying conversations, on their own, are not enough. It is important for teachers to develop their nascent research skills, for example, participant observation strategies. Through participation in collaborative research, teachers can gain access to current findings about teaching and learning as well as a range of research skills and strategies. These skills and strategies not only aid teachers in reflecting on the reciprocal relationships between practice and theory but also bring their voices more centrally into the production of formal theory. When teachers coparticipate in collaborative research, the questions they ask and the problems they face become an integral part of investigations and thus an integral part of formal theory. Through university-teacher collaborations, teachers develop not only research skills but also define and redefine problems that frame important issues in education. If teachers move from consumers of knowledge to producers of knowledge, if teachers develop different identities, will these changes influence the culture of schools?

Changes in Identities Change Local Cultures

Seymour Sarason (1982; 1990) is fond of saying "The more things change, the more things stay the same." He, as well as many others, believe that educational changes are always occurring but have made little difference in schooling (Beyer & Apple, 1988). As long as the classroom teacher remains outside of the decision making process, they argue, little of fundamental change will happen. The real issue is how to include teachers in decision making, and thus in formal theory building. Do teachers decide on which book to read for a particular lesson? Do they decide on how to structure a lesson following a curriculum guide? Or, should teachers be included in both the analysis of curriculum guides and the analysis of teaching practices? Curriculum and instructional materials are cultural artifacts that are meant to guide the translation of policy into educational practice. These materials are the instruments of formal theory that transmit ways of thinking and action. If teachers do not have opportunities to reflect on the norms, beliefs, and formal theories inherent in curriculum and instructional guides and possibly transform them in relation to growing understandings of practice, then fundamental change will not occur. The formal theories captured in these guides will be frozen and reproduced without the benefit of insights derived from practice or current research findings. Further, if teachers continue to see formal and informal theories as crystallized standards, their conversations with parents will be constrained; parents do not have access to or an adequate understanding of the same guiding theories. When teachers are limited to the role of technicians, they will have limited access to new and emergent understandings about the cultural contexts of learning and developmental processes and the implications gained from these new understandings. An impoverished understanding about the relationship between development and cultural practices will lead some teachers to the erroneous conclusion that many children come to school cognitively deficient. This conclusion is a natural consequence of inadequate understandings of development and the mutual influence of home and school environments on learning--both are contexts of development (Miller & Goodnow, 1995). When teachers are producing knowledge without the benefit of tools for reflection and growth, what decisions they make and how they make these decisions will influence classrooms and schools, that is, the culture of schools. A change in teachers' identities and a change in their roles are necessary in order for teachers to make insightful and thoughtful decisions about teaching, learning, and curriculum. Yes, how and under what circumstances teachers participate in the decision making process are crucial.

When teachers' identities change to teacher-researchers, their processes of perception are also changed. These changed perceptions function as cultural schemas (D'Andrade, 1990), which include a representation of how teachers talk, interact, and behave. Cultural schemas frame what is possible and what is not; they frame how teachers see the world. Teachers use their cultural schema to shape their own development, to decide on how they will make decisions, and to decide on their relationship to the production of formal theory. Creating the circumstances for changing teachers' identities from knowledge consumers to knowledge producers and creating the circumstances for teachers to develop different cultural schemas are equivalent to creating conditions for fundamental change in education.

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Multiple Embedded Scaffolds: Supporting English Learners' Social/Affective, Linguistic and Academic Development in Kindergarten

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This article provides a synthesis of language education research and practice pertinent to teaching English learners in kindergarten. Three major goals are highlighted: social/affective adjustment, English language development and content learning appropriate to children's age and grade level. A review is provided of theory and research on second language acquisition in English Language Development (ELD) programs, including the concepts of comprehensible input, social interaction and scaffolding. Scaffolding is discussed, introducing the concept of *multiple embedded scaffolds*, strategies that teachers simultaneously embed in classroom events to support English learners' comprehension, participation and learning even though children's proficiency in English is still limited. Detailed classroom examples are provided in which teachers use *multiple embedded scaffolds* during opening activities for clerical, managerial and curricular purposes. The article concludes that when teachers apply *multiple embedded scaffolds* during routines such as opening activities, they promote social/affective adjustment, English language development and content learning appropriate to kindergarten.

In recent decades kindergarten teachers have been among the first to feel the impact of California's "changing demographics." The changing faces in California classrooms are evident throughout the state, from the cornucopia of the Central Valley to the cities and suburbs of San Francisco and Los Angeles; from coastal valleys to mountain foothills to inland deserts. Border to border, wherever you teach in California, classrooms will increasingly be filled with children for whom English is a new language. In fact, a majority of children now entering kindergarten come from homes where communication is usually carried out in a language other than English. Furthermore, California's English learners represent a stunning array of world languages and cultures. Many have immigrated with their parents, or without them, from every corner of the world. At

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tender ages, their life circumstances have often been much more difficult than anything many of us could imagine. Their parents and guardians entrust them to your care and guidance, hoping for a positive start in school.

Kindergarten represents a pivotal year for all children as they make the transition to the demanding structures of elementary school. For young English learners, however, that transition takes on multiple dimensions because it marks their initiation into a new language, a new culture and a new schooling tradition. For these children, success in kindergarten is particularly important because it paves the way for later academic achievement and integration into the larger fabric of society. Such being the case, kindergarten teachers hold the key to making English learners' transition to school a warm one, a comfortable one, and a successful one.

This article provides a synthesis of language education research and practice to assist teachers in meeting the varied needs of young English learners. This synthesis is based on our own research in kindergartens, our work with kindergarten teachers pursuing M. A. degrees, and our supervision of student teachers as they work with young children learning a new language in school. We cull from this work certain guidelines for working with English learners in kindergarten when English is the language of instruction. In particular, we introduce the idea of ***multiple embedded scaffolds*** as a concept to guide the implementation of kindergarten programs for young English learners.

As you read, you will no doubt find many familiar practices, and thereby be validated in your teaching. For our part, we hope to add theoretical clarity to current classroom practices, while showing some ways that may enhance kindergarten programs for the benefit of English learners. This article is divided into three sections: (1) goals for English learners in kindergarten; (2) theoretical bases of second language acquisition in kindergarten; (3) classroom examples of multiple ***embedded scaffolds*** that address the goals for English learner instruction in kindergarten.

GOALS FOR ENGLISH LEARNERS IN KINDERGARTEN

There are three overall goals for effective English learner instruction: social/affective adjustment, English language development and content learning appropriate to students' age and grade (Peregoy & Boyle, 1997). These goals are not different from those you most likely hold for all your students, nor should they be. However, there are several major challenges teachers face as they attempt to fulfill these goals for English learners in kindergarten. The most obvious is the fact that English learners know little or no English, the language of instruction. Yet every classroom goal must be addressed using English, creating the first challenge. Secondly, when entering kindergarten, young English learners are faced with the daunting experience of adjusting not only to elementary school, an institution that can be intimidating to any child, but also to a new culture and a new language. As a result, the teacher becomes the cultural broker, the mediator, and the bridge builder between home and school cultures. Students' social and emotional adjustment to school depends upon teachers' ability to create such a bridge. This is the second major challenge. Finally, because kindergarten launches children in their school careers, the extent to which English learners experience success early on sets the stage for their future academic achievement, achievement that can only be built upon positive social, emotional and academic foundations. The third challenge then is to provide those foundations while helping children gain competence in English, their new language, the language of instruction and the predominant language in the larger society.

SECOND LANGUAGE ACQUISITION IN KINDERGARTEN

To address the three goals of English learner instruction in kindergarten, we begin by providing basic tenets of second language acquisition as they apply to English language development (ELD) classrooms, especially kindergarten. ELD classrooms are those in which English learners are instructed through English by teachers with knowledge of second language acquisition and professional preparation in teaching English learners. In ELD classrooms, English serves as the *medium* of instruction in subjects such as math, science, social studies, literature and art; or more commonly in elementary school, in theme studies integrating these subjects. In order to be successful, however, teachers must make careful use of communication strategies that help children understand and participate in lessons even though they may know little or no English. To the extent that teachers are successful in making their lessons understandable to children, the language used for instruction simultaneously serves both academic learning and second language development, while creating a positive social/emotional environment for learning.

Comprehensible Input, Social Interaction, and the Negotiation of Meaning

We have stated that teachers need to use certain communication strategies to support the meaning of the language they use as they teach. These strategies may include verbal accommodations such as paraphrasing and repetition together with the use of non-verbal cues to convey meaning, such as concrete objects, visuals, demonstrations, dramatizations, and modeling. When the use of these strategies is successful, English learners are able to understand the content of the lesson, enabling them to learn. Moreover, the teacher's instructional language, thus modified and enriched, serves as "comprehensible input" (Krashen, 1982; Wong Fillmore, 1985), providing the raw material from which children can begin to construct a working knowledge of their new language.

Essential though it may be, comprehensible input is not sufficient for language acquisition (Swain, 1985; Long & Porter, 1985). English learners also need to be able to respond, verbally or nonverbally, in ways that keep them in the conversation, where meaning is negotiated and communication accomplished through give-and-take, trial and error. During conversational interactions, English learners receive important feedback from more proficient English speakers as to how effectively they are using their new language. Such feedback will help them further develop and refine their budding language knowledge. Furthermore, English learners can ask their proficient conversational partners for repetitions, rephrasing and clarification of word meanings, thus prompting their interlocutors to adjust their talk for the language learner's particular needs.

In ELD classrooms, the teacher may not be the only proficient speaker with whom the children interact. Rather, when native English speakers and other English proficient children are present in the classroom, occasions for children to interact and communicate with them multiply, thereby enriching natural language learning opportunities. Because proficient English speakers play such a significant role in supporting the English language acquisition of their peers, it is important whenever possible to include a substantial number of English proficient children in each ELD classroom.

Structuring Social Interactions in Kindergarten Classrooms

In kindergarten classrooms, teachers structure social interactions in a variety of ways at the service of communication and learning: e.g., teacher to whole class, teacher to small group, teacher to individual child, children in pairs or small groups and so forth. Each of these interactional event structures offers different kinds of language learning opportunities in terms of the content, the communicative purpose, the complexity of talk needed, the number and status of people involved, and the extent to which meaning can be conveyed by context and non-verbal cues. For example, the event structure in which a native English speaking child builds blocks with a limited English proficient child differs from the event structure in which the teacher leads a story discussion with the whole class. Each event structure generates its own language learning opportunities as meaning is negotiated, e.g., two children talking one-on-one about where to put the next block vs. the teacher leading the whole class in discussion of whether Goldilocks should have entered the bear's house when no one was home. The block building event is less complex in concepts and language than the Goldilocks discussion, but offers important language learning opportunities specific to the child's own communicative purposes and individual level of interest and language development. The Goldilocks discussion is abstract and less hands-on than the block building, but the teacher has planned it in such a way as to support meaning through careful language use, reference to pictures in the story, dramatization and comprehension checks. In ELD classrooms, the learning environment must be structured to optimize communicative success between teacher and children and among the children themselves through social interactions, ranging from formal teaching-learning interactions to informal peer interactions.

Scaffolding

Together with social interaction and comprehensible input, scaffolding forms the third theoretical basis for effective English learner instruction. Based on Vygotsky's (1978) seminal work, scaffolding may be defined generally as temporary support or assistance, provided by someone more capable, that permits a learner to perform a complex task or process that he or she would be unable to do alone. In learning and development, children are constructing the ability to carry out complex tasks such as walking, talking, reading, writing, and reasoning. Scaffolding facilitates performance of these processes as an integrated whole, in contrast to learning the process by work or drill on smaller component aspects one at a time. Scaffolded performance, repeated and supplemented with direct instruction as needed, eventually leads to full development (Cazden, 1983). The scaffold may then be dropped and a more advanced or more difficult task taken on. Scaffolding is therefore dynamic, changing over time to accommodate and challenge learners' advancing zones of proximal development (Vygotsky, 1978).

In ELD classrooms, students' comprehension and participation must be scaffolded so that they can understand, interact, communicate and learn even though they may have limited knowledge of the language of instruction. In this way scaffolding provides the key to meeting the social/affective, linguistic and academic goals of English learner instruction.

Scaffolding Language Acquisition. The scaffolding metaphor has been discussed in a variety of ways across various disciplines (e.g., Bruner, 1978; Tharp & Gallimore, 1988). Here we are looking specifically at scaffolding that supports language acquisition through social participation in learning activities, especially in kindergarten. We begin with Bruner's seminal discussion of mothers' conversational scaffolds with their toddlers (Bruner, 1978). For example, if the child says: "Mommy birdie", the mother might reply, "Yes, there's a little bird on the fence! Where did he come from?" In this way, the mother takes the child's topic, elaborates it in a natural conversational manner, and asks a question that encourages the child to continue the conversation. In so doing the mother has assisted the child in taking part in a conversation at a level the child would be unable to achieve without her assistance. At the same time, she provides a model of mature linguistic usage that serves as input for the toddler's language acquisition.

Literacy Scaffolds. Building on Bruner's view of scaffolding, Boyle and Peregoy (1990) apply the scaffolding metaphor to literacy development. They define literacy scaffolds as instructional strategies that provide built-in teacher or peer assistance that permits learners to read or write texts at a higher level than they could achieve unassisted. Literacy scaffolds capitalize on the generative use of sentence and discourse patterns in language that provide models students can use to comprehend and produce written language at a higher level than they could achieve without the scaffold. Dialogue journals, for example, scaffold emergent literacy in much the same way that mothers scaffold toddler's conversations. That is, with interactive dialogue journals, children and teachers carry on a conversation in writing. By kindergarten, children already know how to converse orally. Now they use the same conversational discourse structure, but in writing. When replying to children's journal entries, teachers often elaborate on children's topics and ask for further information, thereby encouraging further writing while simultaneously modeling conventional spelling, sentence structure and usage.

Predictable storybooks such *as The Very Hungry Caterpillar* and *The Very Busy Spider* by Eric Carle and *Brown Bear, Brown Bear* by Bill Martin, provide another example of a literacy scaffold. Predictable books scaffold comprehension and production by offering children phrases, refrains or episodes that repeat and are therefore predictable. The repetitive patterns provide young children several chances to understand the story and eventually to memorize parts that they chime in the next time the story is read. As they chime in, children experience success in participating in the story, while producing oral English in the context of its written form. For English learners, literacy scaffolds offer enjoyable opportunities for children to use oral and written English in ways that foster second language and literacy acquisition. Additional examples of literacy scaffolds include pattern writing, mapping, and readers theater (Peregoy & Boyle, 1997).

Routines as Scaffolds. Another useful view of the scaffolding process is provided by Snow (1977), who points out that routines provide scaffolds or structures wherein gradually more complex content may be placed to challenge the learner to his or her next level of development. Snow refers to the act of increasing the difficulty of the content as "upping the ante." Snow's research dealt with mothers' communication with their infants. However, applying her idea to school routines provides teachers with a deeper appreciation of the power of routines in schooling. In Snow's words: "We think of routines as simple and unsophisticated... but their simplicity allows for the introduction, into slots created by the routine, of fillers considerably more complex in structure and/or content, than could possibly be dealt with elsewhere" (quoted in Cazden, 1983, p. 9). The routines themselves scaffold performance at a higher level.

In our view, routines are especially important for English learners because they remain stable, repeating themselves each day. The repetition provides children daily opportunities to learn the language patterns used during the routines. Equally important, the stability of the routines makes life predictable for children, contributing to their emotional adjustment in your classroom. In fact, your daily routines may be the first stable feature some children have experienced in a long time, especially if they have immigrated under adverse circumstances (Peregoy & Boyle, 1997).

Multiple Embedded Scaffolds. Finally, observational research in kindergarten classrooms has revealed ways in which teachers use multiple scaffolds simultaneously embedded in their daily routines to support second language learners' understanding and participation in classroom events (Peregoy, 1991; Peregoy & Boyle, 1999; Gundling, 1995). These studies analyze multiple embedded scaffolding used during whole group instruction, particularly during opening activities at the beginning of the kindergarten day. In the classrooms observed, opening activities included good morning songs and rituals, roll call, calendar, story time and other curriculum activities. Within opening activities, the following scaffolds were embedded:

1. Opening activities provided an overarching scaffold, within which other routines were embedded such as roll call, calendar and story time.
2. Each routine included support for English learners to comprehend the meaning of the language such as pictures, gestures, dramatizations and other non-verbal cues to meaning.
3. Each routine included supports to assist English learners in their ability to participate in the activity by producing an appropriate response, either verbal or nonverbal.
4. Each routine included opportunities for the teacher and/or proficient English speakers to model the appropriate response in its entirety.

5. When the routine dealt with curriculum content, teachers increased the complexity of both language and content over the course of the school year as kindergartners grew in second language proficiency.

CLASSROOM EXAMPLES OF MULTIPLE EMBEDDED SCAFFOLDS

The remainder of this article elaborates on the above five scaffolding components, illustrating how kindergarten teachers can use *multiple embedded scaffolds* in ways that address all three goals for their English learners: social/affective adjustment, English language development, and content area learning. First we discuss scaffolding and learning opportunities related to basic classroom management functions, e.g., roll call. Then we examine two curriculum routines included in opening activities, Story Book Reading and Teddy Bear Time, to illustrate the power of multiple embedded scaffolding over the course of the kindergarten year.

Establishing Routines and Rules of Behavior

At the beginning of the year, every teacher faces the task of establishing daily routines and rules of behavior expected throughout the day. These managerial tasks make life easier for teacher and children alike. For English learners, there is an added advantage. As they come to understand the routines and rules, English learners take the first step in cultural learning, gaining peer acceptance as they begin fit into the classroom community. In addition, they begin to acquire simple expressions related to the routines, such as "Time for recess," "Please raise your hand" and so forth. It is therefore essential to support children who are new to English in understanding and participating appropriately in routine classroom conduct, including hand raising, moving from one activity to another, and lining up for recess. The following example illustrates how one kindergarten teacher, Ms. Alvarez, scaffolded children's performance in basic routines at the beginning of the school year.

The bell rings at 8:30 and children file into the large, well-lit classroom. They put away their backpacks and seat themselves at the rug. When all are seated and quiet, the teacher leads them in singing, "Good Morning." Next the teacher calls roll while at the same time taking lunch count. After calling each child's name, she says, "Hot lunch or cold lunch?" The simple question provides children the language required to respond. Children may respond verbally, which the proficient English speakers do readily, or they may point to their lunch box to indicate cold lunch. In this way the teacher has structured a functional communication event in such a way that non-English proficient children may respond either verbally or gesturally. Comprehension of the question is supported when proficient English speakers point to their lunch boxes if they have brought a cold lunch. Furthermore, as English proficient children answer verbally, they model the verbal response, which has been simplified by the form of the teacher's question. Finally, the daily repetition of the routine increases children's opportunities to understand and participate in the routine. In this way, the simple classroom function of roll call and lunch count has offered English learners language learning opportunities and the chance for social integration into

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the classroom.

Opening activities at the rug also require children to adhere to certain behavioral rules such as hand raising for a speaking turn and sitting still to maximize listening and minimize distraction. These rules must be taught at the beginning of the year when many children still speak little or no English. To assure comprehension, Ms. Alvarez reviews classroom rules each day. For each of her classroom rules, she posts a small symbolic picture on the bulletin board. For example, for the "talk quietly" rule, there is a picture of an index finger over a pair of lips, "shhh." For the "raise your hand" rule, she posts a picture of a hand waving in the air. Not only does she review the rules daily, she also enforces the rules using only English. For example, if a child is disruptive at the rug, she sends the child to his or her table. We observed this one day when a little boy was poking his neighbor to engage him in a little wrestling during opening activities. The teacher said to him, "I think you will be able to sit better at the table. Go to the table." The boy did so, comprehending the general idea more than the specific words spoken. Daily routines such as these offer natural opportunities for certain words and phrases to be repeated in context and thereby learned quickly by all children. At the same time, consistent enforcement of rules established predictable patterns of conduct in the classroom for teacher and students alike.

The language teachers use during clerical and managerial duties needs to be supported by various non-linguistic cues to meaning such as pictures, gestures, and dramatizations. These scaffolds permit English learners to understand the routines and respond appropriately. One way is to structure questions so second language learners can answer non-verbally or else select from two choices provided by the teacher, e.g., "Do you want red or green?" Children may respond appropriately using just one word in this case. In addition, proficient English speakers, who naturally catch on to the routines more quickly, serve as performance models for the English learners. Thus, within the overarching scaffold, the routine itself, teachers build in opportunities for peer modeling while at the same time supporting their own language use with repetition of key phrases accompanied by picture and gesture cues. All of these strategies combined within a predictable, daily routine help English learners understand and participate in the opening activities. Let's now take a close look at scaffolding in two curriculum routines: Storybook Reading and Teddy Bear Time.

Storybook Reading

One kindergarten teacher we know, Ms. Chang, uses a storybook reading routine each day during opening activities after roll call, lunch count and calendar. Her approach is to present a new predictable storybook each week as part of her language arts curriculum. At the beginning of the year, for example, she likes to use simple picture books in which each sentence of the story is accurately portrayed in the corresponding illustration, such as those in Eric Hill's Spot series. By the end of the year, she has introduced more complex stories, such as "The Three Bears" and other simple fairy tales involving more complex plots than the stories in the Spot stories. Her daily read aloud provides various opportunities to engage all children in understanding and enjoying the

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story, with pictures supporting children's comprehension. Ms. Chang rereads the same story several days in a row, varying the presentation, and encouraging children to chime in as they begin to memorize the story. The story then forms the basis of activities for children to engage in at center time. For example, Ms. Chang provides computer-generated copies of the story for each child to illustrate at the bookmaking center, where about five children work at a time. If you visit her classroom, you will often see children "reading" their books to each other, usually based partly on memorization and partly on children's sight word recognition and sound/symbol knowledge. As they read to each other, children practice their emergent reading skills in their new language, English. Interestingly, the print itself often jogs their memory and supports their oral rendering of the story. In this way, written language scaffolds oral performance in the second language.

Scaffolding during story reading may be summarized as follows. The storybook routine, a stable component of opening activities, remains the same throughout the school year, creating the overarching scaffold within which gradually more complex content may be inserted. Story comprehension for English learners is scaffolded by the use of simple, predictable, illustrated texts: a literacy scaffold. A great deal of functional repetition occurs as the story is read and reread for enjoyment, helping children comprehend and later read back the story. In addition, the stories themselves include repetitive refrains and plot structures. Furthermore, the teacher's routine involves a great deal of repetition of the story during group time, not in drill fashion, but in the natural and fun way of hearing a favorite story again. Reading the story to each other at center time further scaffolds children's language and literacy use. Finally, the children take their own computer copies of the story home to read to their parents in proud display of their learning. In brief, the scaffolding pattern employed here consists of the overarching routine of story book reading, the use of predictable books, which were first read by the teacher with children chiming in, later read in pairs by the children, and finally read at home to the parents. Children's zones of proximal development are challenged over the year with the gradual introduction of stories more difficult in length, vocabulary and complexity of sentence structure and plot.

Teddy Bear Time

Another teacher we know, Ms. Jacobs, uses a routine during opening activities involving the class mascot, Teddy, a stuffed bear, to develop concepts about health and hygiene in ways that gradually increase children's verbal and non-verbal participation (cf. Gundling, 1995). On the first day of school, the teacher greets the children at the door while holding Teddy, who pats the children on the head and says, "Good Morning." During the first week of school, the teacher invites children to participate in a movement activity in which the teacher calls out, "Up, down, sideways, sideways". While calling the commands, the teacher moves Teddy so that the bear models the appropriate response, a physical response reminiscent of the Total Physical Response method of language teaching (Asher, 1982). The teacher then makes Teddy do sit-ups, while counting to ten. Children watch and count with the teacher if they wish. Early in the school year non-English speaking children are able to participate in a meaningful activity through non-verbal responses modeled first by Teddy and later by the English proficient children in the kindergarten.

By the end of the first month of school, Ms. Jacobs has usually finished introducing the five health and hygiene concepts she will address during Teddy Bear Time: washing, exercising, eating well, getting up early, and brushing teeth. Each concept is represented by a picture on the bulletin board labeled in block print. "What must we do to stay healthy?" Ms. Jacobs sets up questions to ask Teddy for each item, e.g., "Did you bathe, Teddy?" At the beginning, the teacher asks Teddy the question, and a child is selected to answer *yes* or *no* for the bear. Soon, children volunteer to ask the routine health question while a second volunteer answers *yes* or *no*. The comprehension of the health question is supported by the picture, while children's verbalization is supported through teacher modeling. As the year progresses, Ms. Jacobs moves on to the next health question. As she does so, she increases the complexity of language required for verbal participation. Thus, while the first health question requires only a *yes* or *no* response, later questions require more elaborate linguistic responses. By midyear, for example, if Teddy has not slept well, Ms. Jacobs asks the children why. If they reply that he stayed up too late the night before, or that he had nightmares, such responses require more complex syntax and vocabulary.

As the year progresses, the teacher adds increasingly complex verbal elements to the routine for each question. She supports these new elements with dramatization and props. For example, when asking if Teddy has eaten breakfast, she instructs a volunteer to bring some food from the dramatic play center to feed Teddy. First the teacher names each food item. Then she asks the bear whether he liked each one using the simple sentence pattern, "Do you like...?". In later weeks, after modeling the routine several times, Ms. Jacobs selects a volunteer to ask the question, with another volunteer answering *yes* or *no*. Ms. Jacobs enjoys introducing humor into the routine as well. For example, if Teddy says he has not bathed, she might hold her nose and make a face of disgust, while exclaiming, "How filthy!", much to the delight of all the kindergartners.

The Teddy Bear routine evolves over the course of the school year with the teacher elaborating on it by adding new health and hygiene content along with additional vocabulary and more complex language patterns. She always begins by taking the lead role herself, with Teddy modeling both the actions and language that children may later use. In addition, Ms. Jacobs makes use of the picture chart and the dramatic play props to convey meaning. For each new health and hygiene lesson, she relinquishes her lead role to a volunteer. Furthermore, she gradually increases the complexity of language needed to participate, from non-verbal responses, to yes/no responses, to one-word replies, to routine questions and answers, and later to open-ended responses to why questions, such as, "Why didn't Teddy sleep well?" Throughout the year, the Teddy Bear routine conveys health and hygiene content that gradually increases in quantity and complexity.

The multiple embedded scaffolds in the Teddy Bear routine may be summarized as follows. The opening activity provides the overarching scaffold, within which the Teddy Bear routine provides a second routine scaffold that remains in place throughout the year. As the year progresses, Ms. Jacobs continually "ups the ante," as she introduces new content with additional vocabulary and more complex language patterns. For each of the five health questions addressed to Teddy, the teacher follows the same procedure, introducing the question and its content by modeling and subsequently letting individual children take over her role on a voluntary basis. Throughout the year, the teacher uses various communication strategies, including picture cues, gestures and dramatizations with props like the stuffed bear, food items and cradle from the dramatic play center. In this way, Teddy Bear Time provides a classic example of multiple embedded scaffolds permitting second language learners to understand and participate in an instructional event carried out in their new language, one which becomes gradually more complex and elaborate over time.

SUMMARY

We have described how teachers can use multiple embedded scaffolds during opening activities serving clerical, managerial and curricular functions. At the beginning of the year, routines such as roll call and classroom rule enforcement can be scaffolded to help second language learners participate appropriately. These simple routines provide initial language learning opportunities while socially integrating English learners into the kindergarten classroom community. The content of these clerical and managerial routines remains stable throughout the year. In other words, teachers do not up the ante in these routines. In contrast, in the two curriculum routines, Story Book Reading and Teddy Bear Time, teachers up the ante by providing content and language that increases in length and complexity as the school year progresses. Ms. Chang makes use of predictable storybooks that increases in length and complexity as the year progresses, while Ms. Jacobs makes creative and ingenious use of Teddy Bear Time to introduce health and hygiene concepts that become more elaborate in content and language as the year progresses.

By observing in various kindergarten classrooms, we have learned how teachers scaffold English learners' comprehension, engagement and performance in day-to-day activities. Furthermore, we have come to understand how their scaffolding evolves and changes over time as children become more and more capable of using their second language. Through the analysis of single instructional events, we have discovered how teachers embed multiple scaffolds to support English learners understanding and participation. First, there is the opening activity routine itself, within which are embedded other routines such roll call, calendar, Story Book Reading, and Teddy Bear Time. In each of these routines, teachers provide comprehension scaffolds such as pictures, gestures, and dramatizations using props. In addition, teachers scaffold performance by modeling behavioral and verbal responses and by inviting proficient English speakers to respond behaviorally and verbally, thereby modeling for the second language learners. In this way, English learners are enabled to understand and participate successfully in ways that promote social integration, emotional adjustment, English language development and content learning.

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Although one can identify multiple scaffolding strategies during any given instructional event, it is their dynamic evolution over time that bears true fruit in language acquisition and content learning, thus the need to examine scaffolding over time. The usefulness of routines as scaffolds comes into play as a result of their repetition day in and day out over time. Time, verbal explanation and mental energy are saved when routines are in place, and those savings can be invested in helping children grapple with the increasingly complex content offered during those routines. The teacher increases the complexity, upping the ante, challenging children to their next level of development. It is also over time that teachers gradually relinquish their lead role to the children as the youngsters become capable of taking over the task, whether reading a predictable story or answering elaborately for Teddy. In the use of predictable stories, for example, Ms. Chang introduces the story to the whole group at the rug by reading it several times throughout the week. As children became familiar with the story, they begin to chime in with her. At that point, she offers them their own copies at centers, where they often "read" the story to each other. Finally, they take their copies home to read to their parents. In Teddy Bear Time, the teacher models the response for the class, then invites children to play her part in speaking for the bear, gradually giving them more and more responsibility in performing the routine. Moreover, as the school year progresses, the information and language needed to convey it becomes more elaborate and complex, upping the ante and challenging young language learners to higher levels of performance and corresponding development.

CONCLUSION

In this article we have provided a synthesis of research and practice on teaching English learners in kindergarten. Three goals were highlighted: social/affective adjustment, English language development and content learning appropriate to children's age and grade level. We reviewed theory and research on second language acquisition in ELD programs, including the ideas of comprehensible input, social interaction and scaffolding. Finally, we elaborated on scaffolding, introducing the concept of *multiple embedded scaffolds* by providing classroom examples in which teachers used such scaffolding during opening activities for clerical, managerial and curricular purposes. We conclude that when teachers apply *multiple embedded scaffolds* during opening activities, they help promote social/affective adjustment, English language development and content learning for their English learners in kindergarten.

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The Educational Roots of Garden-based Instruction and Contemporary Gateways to Gardening with Children

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California is the first state to announce an initiative creating gardens at every school by the year 2003. However, school gardens have a long tradition. The writing of six educational theorists, Comenius, Rousseau, Pestalozzi, Froebel, Dewey, and Montessori, are examined here. Numerous gateways to gardening as a context for learning are suggested.

With the resurgence of school gardening in the United States exemplified by the California State Department of Education's (Life Lab Science Program, 1997) vision of "a garden in every school" by the year 2003, educators will need to frame clear rationales for including gardening in an already full schedule of mandates. Fortunately, gardening with children has deep roots within the history of educational ideas. Philosophers of education, Comenius, Rousseau, Pestalozzi, Froebel, Dewey, and Montessori advocate the cultivation of school gardens for a variety of reasons. Each strongly supports the "occupation" of gardening in theory and saw his or her ideas practiced and refined in demonstration schools. A revisit to the ideas of these educational philosophers opens the garden gate to exciting instructional events for teachers and their students.

The Educational Roots

Joann Comenius

Comenius (1592-1670), a teacher, minister and Moravian bishop, who wrote about pedagogy has some very timely commentary for education today. As Keatinge (1967) reported, Comenius said that for every school "...there should be a garden attached where they (students) may feast their eyes on trees, flowers, and plants... where they always hope to hear and see something new" (p. 131).

Comenius believed that people must be taught as far as possible to become knowledgeable by studying the things in the immediate surrounding - the sky, trees, flowers, and soil, not by studying

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books, i.e., "they must learn to know and to investigate the things themselves and not the observations that other people have made about things. We shall tread in the footsteps of the wise men of old if each of us obtain his knowledge from the *originals*, from things themselves, and from no other source..." (Keatinge,1967, p. 150).

Comenius noted that school subjects were mutually supportive of each other so he advocated that "each subject be taught in combination with those correlative to it... exercises in reading and writing should be combined" (Keatinge, 1967, p. 177). Language paralleled observation...

> Words ... should always be taught and learned in combination with things ... words must be explained by reference to the objects they denote; and contrariwise, the scholars (students) must be taught to express in language whatever they see, hear, handle, or taste so that their command of language may ever run parallel to the growth of understanding (Keatinge,1967, p. 177).

If asked how the student retains information in the garden, Comenius would reply "Since the senses are the most trusty servants of the memory, this method of sensuous perception will lead to the permanent retention of knowledge" (Keatinge, 1967, p. 185).

Certainly not all the objects to be learned will pass through the garden. How can we teach about things not present to the senses? "If the objects themselves cannot be procured, then representations of them may be used... models for teaching purposes... illustrations, engravings... images of things that cannot be procured in the original" (Keatinge, 1967, p. 186). Comenius' contribution of the picture book to instruction anticipated the importance of representation to learning and to the yet undeveloped of educational psychology.

In summary Comenius brings the following contributions to garden-based instruction:

1. The idea that the *originals*, i.e., reading the objects in the child's surroundings through sense perception, leads to the development of knowledge.

2. Language is a correlative of all learning. Hence, the garden is one context for language learning.

3. The introduction of the picture book made educators aware of the concept of representation.

One hundred years later Rousseau (1712-1778) examined the potentials of the garden for developing the natural, organic individual.

Jean Rousseau

Rousseau observed that the child approaches the garden wanting to touch and handle everything. He encouraged the teacher to capitalize on the child's natural inclination to approach the surroundings with all sensory channels open. He considered the senses as the entranceway to reason and experience the only teacher of the child. As reported by Boys (1956), Rousseau stated:

> Reading (books) is the greatest plague of childhood... Since everything that enters into human

> understanding comes through the senses, the first reason of man is a reason of the senses. Our first masters of knowledge are our feet, our hands, and our eyes. To put books in place of this experience does not teach us to reason, only to be credulous and to borrow the reason of others (pp. 51, 54).
>
> The senses must always be our guide in the first operations of the mind, the world must be our one book, facts the only instruction. The child who reads does not think: he only reads. He learns nothing but words. Make your pupil attend to the phenomena of nature, and you will soon arouse his curiosity (pp. 72, 73).

For Rousseau agriculture or gardening was the first and most noble profession of mankind. Rousseau's ideal was the natural man. In *The Emile* by age 15 Emile will come to realize the importance of agriculture, not because the teacher advises that he must study agriculture but because for the past 15 years the child's experiences in the natural world lead him to this conclusion. Ask a 15-year-old of today what he believes to be the most noble of professions!

Rousseau had yet another reason for using gardening in instruction. He noted that the first idea that a child should have given to him is that of property.

> The easiest way for him to learn about property is through the work he does in the garden in imitation of the gardener (the child is an apprentice to the more skilled gardener)... he plants beans and when they come up, they 'belong' to him. To explain what 'belong' means, I make him feel that he has put his time, his work, his effort, himself into them. There one day he finds that his beans are dug up by Robert, the gardener. The ground belongs to the gardener and he must come to an arrangement with the man before he can raise beans again (Boyd, 1956, p. 44).

In summary, Rousseau brings these major contributions to garden-based instruction:

1. Nature in the garden is the only teacher until about age 12-15 when the book *Robinson Crusoe* is introduced.

2. The garden is the setting for training the senses and, therefore, the reason of man. The educated man learns to sense, to feel, to desire, to will, and to reason in the garden.

3. Rousseau's student is an organic child as if springing from the soil.

Johann Pestalozzi

The Swiss Pestalozzi (11746-1827) called for the education of the head, hand, heart, and health through farming. He had been a minister and lawyer, abandoning both careers to turn his farm into a school for poor children.

Pestalozzi based all learning on *sense perception* and *physical activity* and was most influential in helping to frame Piaget's theory of sensorimotor intelligence two hundred years later. Pestalozzi adopted as his central principle of education, *Anschauung*, or actual sensory experience, carefully organized and systematically worked out as the only sound basis of instruction. As Domas (1975) reported, Pestalozzi said: "The child of my method feels his power only in surroundings that are real to him... he is not puffed out with empty learned words which have no background in his experience" (p. 83). Pestalozzi's reading lessons were outdoors and were "object lessons" of butterflies, flowers, trees, and soil.

An observer at the school at Yverdon noted: "Sometimes the pupils had a little patch of their own to cultivate; sometimes they were sent off in twos and threes to work for a few hours, under the direction of the gardener (Downs, 1975, p. 65).

The children in his demonstration schools examined objects first rather than reading books about them, and what the students discovered for themselves would be expressed in their own words rather than adopted from what they found in books. Students made and bound their own books.

As reported by Green (1969), a description of a Pestalozzian classroom using the object lesson states:

> Students observe first all of the objects in the classroom, observing and naming everything. When this is exhausted, they are taken into the garden, into the fields, and woods - where they are led to notice objects on greater detail, their permanent and changeable qualities, the qualities that are general and those that are peculiar to them, their influence, their function, their destiny (p. 53).

If asked how the child would learn about those things which are not within direct observation, Pestalozzi would reply with what he called the Law of Physical Distance, a notion that extends the importance of representation as introduced by Comenius. He stated "that clearness of knowledge varies according to the nearness and remoteness of the objects which are in touch with my senses... Knowledge derived through our senses has an analogical value; by its means I learn the characteristics of things which have never come within my range of observation" (Green, 1969, p. 109). The sensory knowledge acquired through direct experience is an environmental code that makes reading printed material meaningful.

In summary, Pestalozzi's major contributions to garden-based instruction are:

1. The child's concepts are an environmental code for reading the near and the distant.
2. The 4-H movement adopted the head-hand-heart-and health model in their educational program.
3. Sensorimotor activity was the basis of learning.
4. The object lesson moved reading and science within the same context of instruction.

Frederick Froebel

Froebel (1782-1852) wrote The *Education of Man* in 1826. In his plan for the first kindergarten, a considerable part of the child's day was spent on gardening, for Froebel believed that each child should have a small garden of his or her own and that there should also be two large beds common to all, one for flowers and one for vegetables. He wanted the children tending their own plots to realize that they were part of a larger garden and that they were responsible for keeping their own sections well cultivated. He said it will be obvious to the children which ones have been good caretakers; they will monitor each other. If a child can't have a garden plot of his or her own then he or she should have plants in boxes or pots for "the care of plants will gratify his desire to observe other things, such as beetles, butterflies, and birds" (1826/1974, p. 111).

The garden was seen as a place to build character and responsibility. Froebel instructed that "The child who has guarded and cared for another living thing.... will be led more easily to guard and foster his own life" (1826/1974, p. 112). The garden is a place to learn the consequences of one's actions in a very direct way. Froebel noted: "...for here man sees his work bearing fruit in an organic way... depending upon his work and the character of his work" (1826/1974, p. 111).

The garden is also the setting for the teaching of colors. The availability of natural light and natural pigments from plants provide the ingredients for painting flowers, butterflies and birds. He recommended that painting flowers start with those that have very distinct colors like blue campunulas and yellow primroses (1974, p. 301). Children painted outdoors among the plants of their school garden.

For Froebel the garden was the starting point of instruction. He said that all instruction should start from the pupil and his or her nearest surroundings and should again return to him or her.

> The pupil will get the clearest insight into the character of things, of nature and surroundings, if he sees and studies them in their natural connection.... the objects that are in closest and most constant connection with him, that owe their being to him... these are the things of his nearest surroundings... the garden, the farm, the meadow, the field, the forest, the plain.... Instruction should proceed from the nearest and known to the less near and less known. (1826/1974, pp. 251, 262)

Each of these places, the garden, the farm, the meadow were called "budding points" for branching out in new directions of knowledge. Froebel advised the teacher to use these budding points to initiate and elaborate instruction. For example, the colors in the garden are part of the more formal studies of pigmentation in botany and light theory in physics, knowledge which the teacher needs to plan instruction.

In Froebel's theory language is a unitary principle in a three-part individual - inner life, outer world and language. The inner life or mind of the child is organized with the outer world of nature through language. It is language that unites the inner world and the outer world of each individual (1974, p. 138). Froebel's insight into the importance of language as an organizing principle of self was later to influence Freud and psychotherapy as well as modern educational psychology.

In summary, the contributions of Froebel to garden-based instruction are:

1. The garden is the "budding point" of instruction.
2. Instruction should proceed from that which is near to that which is less near.
3. Gardening teaches consequences of one's actions in an easily observable way.
4. Language is an organizing thread for the individual learner.

John Dewey

Dewey (1859-1952), always concerned with the development of thinking in students through useful social experiences, wrote in 1944:

> Where schools are equipped with *gardens*... opportunities exist for reproducing situations of life, and for acquiring and applying information and ideas in carrying forward of progressive experiences. (p. 162).
>
> Gardening need not be taught either for the sake of preparing future gardeners, or as an agreeable way of passing time. It affords an avenue of approach to knowledge of the place farming and horticulture have had in the history of the human race and which they occupy in present social organization. Carried on in an environment educationally controlled, they (gardens) are means for making a study of the facts of growth, the chemistry of soil, the role of light, air, moisture, injurious and helpful animal life, etc. There is nothing in the elementary study of botany which cannot be introduced in a vital way in connection with caring for the growth of seeds. Instead of a subject belonging to a peculiar study called "botany," it will then belong to life, and will find, moreover, its natural correlations with the facts of soil, animal life, and human relations.... It is pertinent to note that in the history of man, the sciences grew gradually out of useful social occupations (pp. 200-201).

The term "occupation" is one that arises frequently in educational theory and means for Dewey not a specific job but rather an organizing and integrating thread by the nature of the activities involved. The activities of gardening engage the child in the experimental method, into experiences that involve thinking and problem-solving. In his book *Schools of Tomorrow*, Dewey (1915) documents schools throughout the United States utilizing gardening to implement his philosophy. His own laboratory school at the University of Chicago operated a garden.

Dewey criticized Pestalozzi's object lesson for isolating observation and action. He said that a child learns the properties of objects not merely by observing them but also by using them. For example, the child learns more of the properties of plants in the garden by making a meal, drying and storing seeds, designing bouquets, growing dye plants to extract the dye and color the wool and cotton, growing broom corn to make brooms, weaving with wheat straw, and grinding corn to make flour to make bread.

With regard to specific reading methodology, Dewey (1944) observed:

Children do not set out, consciously, to learn walking or talking. One sets out to give his impulses for communication and for fuller intercourse with others a show. He learns in consequence of his direct activities. The better methods of teaching a child, say, to read, follow the same road. They do not fix his attention upon the fact that he has to learn something and so make his attitude self-conscious and constrained. They engage his activities and in the process of engagement he learns. (p. 169).

Dewey viewed the reading of printed resources as an organic outgrowth of direct experience inquiry. He differentiated between two levels of experience - primary or direct and secondary or reflective. Phenomena in the garden are the subject matter of direct experience. Books, which are the observations and inferences of others, are secondary sources and as such are tools of inquiry. Secondary sources were appropriate only in so far as they were needed to extend personal inquiry.

Dewey's (1966) ideas on reading state:

> Books and the ability to read are regarded strictly as tools. The child must learn to use these, just as he would any other tools. This implies that he shall have arrived at some conception of what they are for and have some end in view or motive for using them, and that the actual learning to read shall grow out of this motive [and] familiarize the child with the use of language as a means of discovering something otherwise unknown and of sharing with others what he himself has found out. Hence, reading is taught in close connection with other subjects, science and history, and not as a separate subject by itself. As soon as the child has the idea what reading is for and has a certain amount of technical facility, printed material is supplied him, not as a textbook, but as an additional tool in his equipment (pp. 26, 27).

Dewey would recommend the things in the garden – the plants and the animals as the basic instructional material. Compare the cost of a text for each student to the cost of a package of seeds. The plants and the animals of the garden tell an ongoing event-filled story of the attentive child. Dewey (1910) noted that gardening had the plot interest of a good drama by including the old and the new, the familiar and the unexpected, the routine and the serendipitous (1910, p. 193).

Dewey's contributions to garden-based instruction are:

1. Gardening is an activity that provides the opportunity for the development of thinking.

2. The garden is a site and source for primary reading, i.e., the reading of objects and events.

3. Gardening as an "occupation" exemplifies the growth of human knowledge.

Maria Montessori

Montessori (1870-1952) used the garden as a context for education, as content for instruction, and as reflection for the students. She (1912/1964) describes the garden of the first Children's House in Rome.

> We have a vast courtyard, cultivated as a garden, where the children are free to run in the open air - and, besides, a long stretch of ground, which is planted on one side with trees, has a branching path in the middle, and on the opposite side, has broken ground for the cultivation of plants. This last, we have divided into so many portions, reserving one for each child.
>
> While the smaller children run freely up and down the paths, or rest in the shade of the trees, the 'possessors of the earth' (children from four years of age up) are sowing, or hoeing, watering or examining the surface of the soil watching for the sprouting plants (p. 161).

The garden supplied the rudiments to make people observers of their environment, a characteristic Montessori notes is crucial to be educated. Intellect is rendered useless without sense education that puts a person in direct communication with the external world.

The garden promotes the observation of nature and the care of living things with the purpose of developing foresight by auto-education for the ultimate end of the process of education was to be in control of oneself. Montessori (1912/1964) said: "When he knows that the life of the plants that have been sown depends upon his care in watering them... without which the little plant dries up, ...the child becomes vigilant, as one who is beginning to feel a mission in life" (p. 157).

Education of the senses, especially between the ages of three to seven, a period of rapid physical growth, is the foundation for intellectual education in the Montessori method. Whenever possible the sense to be trained was isolated. For example, in educating the sense of smell, the child would be blindfolded and presented with a series of different flowers that he or she had to identify solely on the basis of scent.

A natural complement and consequence of observing nature in the garden was drawing. When Montessori taught children how to dissect flowers, she (1917/1965) observed:

> With great care they placed them all in order on a piece of white paper, as if they had in mind some secret purpose. Then with great joy they began to draw them and they were accurate, skilled, tireless, and patient. ... They began to mix and dilute colors to obtain correct shade. They worked up to the last minute of the school session, finishing off their designs in watercolor. (pp. 313-314)

Montessori believed that a positive feeling for nature is developed by the child because the cultivation of living things gives back far more to the child than it demands in labor. Montessori (1912/1964) further noted:

> When the child has cultivated the iris or the pansy, the rose or the hyacinth, has placed in the soil a seed or bulb and periodically watered it, or has planted a fruit bearing shrub, and the blossomed flower and the ripened fruit offer themselves as a *gen-*

> *erous gift* of nature, a rich reward for a small effort. (p. 160).

Montessori, a physician as well as an educator, was aware of the importance of physical health to intellectual growth and development. The school gardens of the Children's Houses grew fresh fruits and vegetables to be consumed by the children at the two meals served at school. Vegetable soups were a regular meal, and, as Montessori (1912/1964) stated: "I should have cultivated in the garden plots vegetables which can be used in the diet, in order to have them plucked in their freshness, cooked, and enjoyed" (p. 135).

In summary, the contributions of Montessori to garden-based instruction are:

1. Observation training in the garden builds a psychological attachment to the external world.
2. The activities of gardening make the child aware of his or her influence on the surroundings.
3. The garden supplied nourishment for the physical growth and development as well as intellectual growth and development.

Gardening has a long tradition in the history of educational ideas. Not only did each of the aforementioned theorists strongly support the "occupation" of gardening in a theory but each observed his or her ideas practiced with children in schools. By revisiting the past one finds that the current resurgence of school gardening is part of an ongoing tradition rather than a new panacea, a current innovation, or an additional curriculum burden. The challenge for teachers is to synthesize and appropriate the contributions of educational theorists into a rationale that promotes the advantages of garden-based instruction in contemporary classrooms in California and the nation. Suggestions to help teachers in this endeavor follow next.

CONTEMPORARY GATEWAYS

Gardening with children provides a sustained opportunity for physical, emotional, social and cognitive development. Activity in the out-of-doors brings joy and vigor to life. The fragrances, textures, colors, tastes, and sounds delight the senses. The gardening experience encourages questioning, describing, predicting, sequencing, inferring, and other thinking skills. Planning a garden and arranging the garden plot are visible expressions of a mind at work. Gardening provides an opportunity for children and adults to work together to set goals, solve problems, tend their garden and enjoy the fruits of their labors. The learning that takes place in a garden is as significant for today's urban and suburban youngsters as it is and was for their agrarian predecessors.

Cultivating plants promotes a nurturing attitude towards the child's surroundings. In gardening a symbiotic relationship is established in which the child acts upon the soil, seeds, and young plants and they respond; the child then identifies and carries out the next step, such as staking, transplanting, fertilizing and the like, and in so doing establishes a continuous cycle of interaction moving towards the goal. This plant-person interaction builds sensitivity to the natural environment, responsibility towards it and an awareness that one's actions have real consequences. A garden teaches responsibility by demonstrating that sustained attention and nurture bring the tangible rewards of food, flowers, and sensory delights.

All children can experience success in a schoolgarden. There children of diverse backgrounds and abilities can work together. The nonreader, the at-risk child mentally and/or physically challenged, the refugee, the immigrant can all contribute toward common goals. There is a place in the garden for the gregarious and for the solitary. Gardening activity can extend attention span keeping easily distracted children on-task far longer than is possible in some other activities. The garden can be a place to test one's limits and to experience success. Contact with the earth can help provide a perspective on one's place in nature. Work in a garden can show the child that the natural world responds to the behavior of humans and that humans must take care of the natural world in which they live. Early experiences in gardening can help to establish the awareness that dreaming, planning, revising, and tending of a garden leads to enjoying the results of one's efforts. The process that leads to success in a garden can be a microcosm of success in all areas of endeavor.

How might the teaching garden serve as a context for learning in the contemporary early childhood classroom? Having a theme assists teachers in planning and the student in focusing energies and anticipating the adventure ahead. Themes will be as diverse as the experiences and imagination of the originators.

Words inspire themes. Children love to see their names (name cards of seeds they planted) sprout out of the ground. Use hardy, fast growing seeds, such as mustard, kale, lettuces, chard, cress, arugula, beets, chicory, mizuna, pac choy, broccoli raab, and radishes. Eating their names is an easy way to introduce fresh fast food salads early in life. Also, enliven spelling practice by having students sow a list of spelling word seeds.

Words have a magical quality for young children. Plants with unusual names capture the imagination as they anticipate seeing the moonflower, snapdragon, bleeding heart, devil's claw, johnny-jump-up, balloon flower and the cup and saucer vine. Young minds delight in the extremes of "believe it or not" gardens with giant sunflowers, scarlet runner beans, skyscraper corn, big Max pumpkin, and giant gourds. Likewise, Lilliputian gardens are equally enchanting with miniature plants like strawberry popcorn, Bambino or Thumbalina carrots, Baby Boo or Munchkin pumpkins, Baby Bubba okra, gherkin cucumber, and alpine strawberries.

Plants provoke conversation. Blossoms with facial expressions like black-eyed susan, forget-me-not, lobelia, pansy, streptocarpus, torenia, viola, and violet, and composites with a face-like center such as sunflowers, daisies, and cosmos seem to turn their heads to listen. Musicbox sunflowers growing 21/2 to 3 feet tall are perfect for the child to meet a flower to face to face. Encounters with flowers can be represented through pantomime and dance. Dandelion puff and blossom droop are potential dances. The twist of a tendril, the twining vine, the sway of a wildflower, the floating of a dandelion can be expressed in dance, making portraits and masks of plants stimulate observation. Georgia O'Keefe trained herself to examine the face of flowers.

Imaginary conversations with flowers can encourage oral and written language and concept development. The evening scented primrose produces large, fragrant blossoms that burst open in seconds at dusk or in a darkened classroom displaying crisp, yellow, four-petaled flowers, which seem to say hello. Another plant that seems to greet us is the daylily, which produces a flower whose blossom lasts only a single day or single night. This plant may be observed for life cycle.

Seed pods and seeds can create language experiences that lead to written extensions. A favorite seed pod and seed for children comes from the balloon vine. The tiny white flowers turn into pale green three-sided puffy balloon seed pods. When pods are popped, several rather large circular black seeds tattooed with a white heart surprise viewers.

How else might the child start a conversation with a flower? Try these openers: 1) Read a favorite storybook to a flower. 2) Introduce a classmate to a flower. 3) Report the weather to the rain lily. 4) Whisper a secret to a flower and let it whisper one back. 5) Tuck a note for a friend into a snapdragon messenger. 6) Sing a song to a trumpet flower. 7) Ask the aster a question. Children's dialogue with plants can be recorded on a bulletin board thought garden.

A flower clock stimulates questions, observations, and speculations. To add a new dimension to the teaching of time concepts, introduce children to evidence of biological rhythms with the opening and closing of blossoms.

The idea for a flower clock became popular in the 18th century when Carl Linnaeus, botanist, observed and recorded the time at which various flowers opened and closed. Just as his observations led him to design floral clocks, student observations can yield a colorful timepiece for the school.

Once plants are selected choose a sunny location for the trial clock. Arrange the initial clock plants in portable pots in a circle, arc, square or whatever design is preferred. Children can observe and chart opening and closing times. These records will serve as a guide to future development of the clock's face. Plants can be added as children, parents and the teacher observed the opening of flowers in backyards, along roadsides, at botanical gardens, and plant nurseries.

Floral Clock
Candidates
California Poppy
Carnation
Dandelion
Daylily
Evening Primrose
Four O'Clock
Ice Plant
Moonflower
Morning Glory
Passion Flower
Portulaca
Vesper Iris

After the first years trial clock has been fine-tuned, a permanent bed may be established. A parent volunteer photographer may assist with taking time-lapse frames for a film of the clock in action. Older schoolmates can create flower clock flip books while younger children make origami flower puppets that open and close.

A fragrant garden theme enhances the child's sensory experience of a garden. Beebalm, carnation, lilacs, nicotiana, peonies, stocks, sweet peas, and old-fashioned roses can transform a schoolyard into a perfumery.

Herbs open new explorations for all of the senses. Kitchen herbs such as basil, chives, cilantro, dill, rosemary, sage, tarragon, and thyme can be grown and tasted. Chamomile, lemon balm, pineapple sage and a variety of mints (apple, chocolate, orange, peppermint, pineapple, spearmint) make soothing teas and flavorful ices.

A nosegay garden patterned after the scalloped paper doily and seeded with ingredients for students to make individual herbal tussie-mussies (child-sized bouquets that communicate an emotion through the language of flowers) might include chamomile, lavender, mints, rosemary, old roses, sage, scented geraniums, sweet william, and thyme.

Touch provides the most direct contact with the environment. Through touch the child acquires feelings of fondness and foreboding about the world. The activities of gardening digging, raking, shoveling, watering, sowing, pulling weeds - put the child in touch with the earth. Touch can be encouraged in the garden through the use of plants that beckon to be rubbed like the fuzzy and woolly leaves of creeping thyme, lamb's ears, mullein, and sage.

Books and stories such as Lois Ehlert's *Growing Vegetable Soup* and *Planting a Rainbow*, Beatrix Potter's *The Tale of Peter Rabbit*, Anita Lobel's *Alison's Zinnia*, Charlotte Zolotow's *Know a Lady*, Barbara Cooney's *Miss Rumphious*, and Peter and Jean Loewer's *Moonflower* can add depth to the child's experience with gardening.

The *Plant Sitter* by Gene Zion illustrates a child's sense of responsibility to chlorophyll pets. The garden can help children understand that plants, like children, need help to remain healthy and care when they become ill. Children can be taught to examine plant leaves, stems, flowers, roots, soil for signs of health problems and provide sponge baths with dishwashing liquid to remove dust buildup on leaves and stems and to thwart scale and mealy bugs, the more common pests. The habit of looking for insects and diseases on houseplants can be invaluable in the outdoor garden as well. Treatment of health problems might include repotting, pruning, and trimming roots.

The garden can supply the raw material for puppetry and dramatizations. *Miss Hickory* comes alive when hickory nuts and twigs are glued together and dressed in gingham. Make cornhusk, hollyhock, and snapdragon doll characters that perform on a carpet moss stage with seed pod props.

The symbiotic relationship between plants and animals can be studied through gardening activities. Attracting toads, butterflies, and birds to the school can become a yearlong campaign. Butterfly sunning stones, shallow saucers of water in a shady sheltered spa for toads, and a row of birdhouse gourds initiate the process of habitat preservation and restoration. Through experiences with the garden as an ecosystem, can begin to understand the interrelations between plants, animals and people. The school garden as a small scale life-support system enables the child to act locally on behalf of the global environment. The knowledge gained in the school garden encourages children to respect living things.

The schoolyard rabbit can demonstrate the reciprocal relationship between plants and animals. When children plant lettuce and carrots for the rabbit's diet, the rabbit contributes droppings, which are recycled into the garden soil. The student school snack and lunch menu can become part of the composting cycle too. Composting or vermicomposting is the common denominator of both meal and garden preparation. Food preparation waste such as peels, hulls, seedcoats, stems and leaves can be returned to the land to nourish plant life and small creatures. Feeding the worms can become as routine as recycling the newspaper, aluminum, plastic and glass.

Seed saving is another form of recycling, whether seeds come through collecting dried seedheads in the school or home garden, or through food preparation or at mealtime. Saving seeds introduces a child to genetics and plant breeding. Since the seed contains the history of the plant species, the child apprentice working with the teacher can observe the traits and characteristics of plants and practice methods such as isolating and hand-pollination to maintain or to alter traits. Growing a garden from seed is a wonderful journey into the past and future of plants. Understanding domestication and natural and artificial selection begins in the school garden.

Children are seedfolk at heart. They enjoy collecting, sorting, weighing, and packaging seeds; designing seed envelope graphics; writing instructions on packages; and giving the designer packets as gifts to grandparents, playmates, neighbors and teachers. Seed experiences surrounding sowing, germination and seed saving promote the growth of number, classification, measurement and seriation operations.

Flavorful foods inspire gardens and healthy eating habits. Spaghetti and pizza are popular with most children. School grown ingredients can start with a windowsill or indoor grow light herb garden and expand to an outdoor circular pizza-pie shaped garden planted in wedges of Roma tomatoes, zucchini, onions, peppers, basil, oregano, and parsley. Adding garlic and spaghetti squash create a dual-purpose garden. A space six feet in diameter is adequate to accommodate the ingredients for the spaghetti/pizza plot.

Gardens of underground vegetables build suspense up to harvest time and even beyond when the flavor of a newly introduced food may surprise the palate. Beets, carrots, celeriac, onions, parsnip, peanuts, potatoes, radish, rutabaga, sweet potato and turnip will intrigue the curious enough to ask to peek beneath the soil.

Planting a breakfast cereal bowl, a school lunch box, after school snack, or a pita pocket garden can increase awareness of how often we rely on others to supply ingredients we could grow ourselves. The school garden should be the nutrition laboratory where ingredients for 5-A-Day and the USDA Food Pyramid are grown to eat as part of the school breakfast and lunch program. School food service personnel may be able to assist student chefs in planning menus from the garden to the table, in growing and preparing food for maximum nutrition and recycling from the kitchen to the garden. Since consumption is an anticipated pleasure of gardening, growing, preparing and enjoying food from the children's own garden assures pleasurable association.

Ethnic theme gardens enable the cultural culinary heritage of the school's clientele to be grown in a school's garden, celebrated via the menu, and tasted at the table. For example, native American gardens combine the excitement of replicating the past while practicing intercropping for the benefit of the soil, and harvesting corn, beans, squash, sunflower, and gourds for recipes and crafts.

Gardens have long been hiding places for children. Building a place as one's own, a green room, to be in to write, read, dream, sleep, make-believe or just

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to be alone is a childhood delight. Vines like honeysuckle, scarlet cypress, sweet pea and thunbergia and trees like weeping cherry, mulberry and willow offer seclusion and enclosure. Sunflower houses, corn columns, morning glory mansions, hollyhock tents, scarlet runner bean teepees, kudzu castles, and grapevine grottoes make annual and perennial classrooms.

Housekeeping in the classroom becomes a cheerful endeavor when children grow materials for brooms for clean-up time or sort supplies into baskets woven from basket grasses gathered from the school prairie garden. Broom corn and basket grass seeds can be ordered from Seeds Blüm and Nichols Garden Seeds catalogs, respectively. Washing with a plant strengthens the kinship between plants and little people. Washing with a squash grown at school, the luffa, is a delight for students. The luffa scrubs hands, desk tops, and vegetables. The leaves of the soapwort plant produce a sudsy lather when rubbed in water and can be used as a soap substitute.

Garden catalogs appeal not only to adults but also to children. A classroom collection or catalog library is a useful reference from planning to harvest. Growing the plants in the pictures offers dramatic lessons about the degree of information loss in printed or pictorial representations. Current catalogs that are particularly sensitive to the child gardener are: Burpee's, Henry Field's, Gardens for Growing People, Gurney's, Johnny's, Kids in Bloom, Park Seed, Pinetree Seeds, Select Seeds, Seeds Blüm, Shepherd's and Shumway.

The motivation for growing a school garden will come, in part, from the novel ways of "packaging" the garden. Raised beds are a good option for individual and group gardens for many reasons. Beds are usually two, three, or four feet wide and as long as needed. They are gardened from both sides placing plants within easy reach of gardeners so that soil and plants are never stepped on. Amendments are easy to add and adjust. The beds accommodate horizontal and vertical systems such as square foot blocks and trellises in summer and a tunnel covered garden in winter. Some raised beds can be used as interim cold frames. Raised beds can yield an intensive harvest of food and flowers. The only drawback is their permanence and, thus, lack of flexibility.

Portable growing systems move with the children. The following examples illustrate a variety of inexpensive portable containers for indoor and outdoor use.

Detergent Scoop Gardens

Detergent scoops offer convenient and compact miniature gardens for fresh sprouts, individual salad greens or a mesclun collection, herb garnishes, and petite flower boxes. The handle suggests giving the garden as a gift.

Film Can Pots

Cans that held 35mm film are available in quantities from local film processors. Wash the cans in soapy hot water. Puncture a hole in the bottom for drainage and to place a wick through for ease in watering. Add wet soilless potting mix. Film cans make excellent starter cells for herbs and flowers.

Seashell Planters

Seashells are natural planters for quick to germinate salad ingredients like cress, chia, radish, mung bean, and alfalfa seeds. Using a sprayer to mist the soil prevents dislodging seed in the shallow shells. Seashells are footings when forcing bulbs indoors. Mosses cling to seashells for fairy and make-believe gardens.

Eggshells

Eggshells are another inexpensive seed starting container and they may be transplanted with the seedling. Herbs, vegetables and flowers sprout easily. Crush the eggshell before transplanting into outdoor soil.

Pickle Bucket Gardens

Five-gallon pickle buckets from fast food restaurants or five-gallon frosting buckets from donut shops and bakeries provide a child-sized planting system. Buckets with handles are mobile so one can change the shape of the garden, insert companion plants, alter a color arrangement if a rainbow effect is desired, isolate plants to prevent cross-pollination and to control insect pests, correct location for sun or shade, and deter pets from digging or trampling tender seedlings. Vegetables like tomatoes, peppers, eggplant, okra, and bush beans do very well in buckets and each offers a rainbow of colors. Bouquet flowers for buckets include bachelor buttons, cosmos, snapdragons, and zinnias.

The tradition of gardening with children has a long history in educational theory and practice. The contemporary classroom can perpetuate and enrich the tradition. The yield from a school includes habits, feelings, understandings and memories that endure. The incentive of growing one's own food and flowers can create an awareness of the individual's power to develop, influence, and maintain an ecosystem that supports one's life. A garden becomes an educational investment for lifelong learning. California has taken the lead among the states in announcing an initiative to create teaching gardens at every school by the year 2003. Plant on!

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Balancing Constructivist and Instructivist Curriculum Goals in Early Childhood Education

Lilian G. Katz

The field of early childhood education has long been marked by intense controversy concerning appropriate curriculum and teaching methods and goals. This article explores some implications of traditional dichotomies of the field and suggests that while there are many reasons to resist the side that advocates formal academic instruction, it does not necessarily follow that what is offered to children in nonacademic programs sufficiently addresses their intellectual development. In particular, it is asserted that common confusion between academic and intellectual goals often leads to the neglect of the basic intellectual dispositions of young children, all of which must be strengthened and supported in the early years. An example of a project conducted with young children that addresses all the major goals of early education is appended.

Dissention concerning curriculum and teaching methods has been a feature of the field of early childhood education from its beginnings. In recent times Roopnarine and Johnson (1993) have noted that early childhood education is "a profession teeming with controversy, impassioned with deeply held convictions, and inspired by rival value systems" (p. iii).

The persistent polarization concerning curriculum and teaching methods is related to many factors. Among them are ideological positions—usually referred to as philosophies, competing theories of development and learning, and conflicting pressures from various stakeholders concerning the desired outcomes of early childhood education.

The issues involved have been expressed in various ways. Some are stated in terms of the aims and goals of the programs, e.g. academic learning versus personal-social development, teacher-centered versus child-centered (See Stipek, 1993). Some define the issues in terms of the respective roles of the teacher and the children, e.g. teacher-directed versus child-initiated (Marcon, 1992, 1995). Others express the issues in terms of the content and nature of the activities offered, e.g. Hirsch (1996a & 1996b) (See also Goffin, 1994).

Contemporary exchanges on these long-standing issues tend to be cast in the language of *constructivism* or socio-constructivism, emphasizing children's active *construction* of knowledge in contrast to children's passive reception of *instruction* offered to them by adults.

The purpose of this article is to explore some implications of the traditional polarization referred to above and to suggest possible alternative views. In particular, I suggest

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that neither of the two competing positions sufficiently addresses the importance of supporting children's *intellectual* versus academic development. That is to say that just because young children are not engaged in drill and practice of academic exercises *does not mean that what they are doing sufficiently supports their intellectual development.*

Dichotomizing Curriculum and Teaching Methods and Goals

Current use of the term *constructivism* as a rationale underlying curriculum and teaching methods suggests that dissension in the field can be dichotomized as two competing views on how children best learn and on desirable goals. On the one side the young child is seen as an active constructor of knowledge and understandings; a major goal of a constructivist curriculum then is to provide ample opportunity for active construction of knowledge. On the other side, children are seen as dependent on another's instruction in the important knowledge and skills that will launch them onto a good start for their later academic achievement (See Katz, 1996). This dichotomy captures the major disagreement in the field concerning the extent to which an early childhood curriculum and its associated teaching methods should offer children ample opportunity to actively explore their environments and engage in spontaneous play. On the constructivist side it is assumed that such child-initiated

Table 1. A summary of the common terms used to describe contrasting emphases in curriculum and teaching methods in early childhood education

Constructivist	Instructivist
Child initiated activities	Teacher initiated or teacher directed activities
Child-centered topics and activities	Teacher-centered or teacher-determined topics & activities
Play-based, "progressive" curriculum	Didactic or "traditional" school curriculum
Personal-social development goals	Basic academic skills mastery goals
Developmentally appropriate curriculum and methods	Developmentally inappropriate curriculum and methods
Progressive/child centered, encouraging children to construct their own knowledge	"Core Knowledge" systematically presented to children
Informal/Unstructured	Formal/Structured
Classroom organization	Organization
Process oriented activities emphasized	Product oriented activities emphasized

exploration, well "scaffolded" by adults, is the developmentally appropriate way to support their learning. By contrast, others favoring a large component of formal instruction in basic academic skills put children in a passive receptive role of internalizing the knowledge transmitted and systematic practice of the literacy and numeracy skills to be learned. These dichotomies are summarized in Table 1.

However, as we explore some of the implications of this traditional dichotomy in the field, and examine other ways to define the goals of early childhood education, it is useful to keep in mind that today most classes offer some mix or blend of these two positions.

More than half a century ago, Dorothy Gardner (1942) attempted to put to rest, once and for all, the similar raging controversy at that time about curriculum and teaching methods by conducting a comparative study of two nursery schools. School A was characterized by what would be called today "developmentally appropriate practice" (DAP) emphasizing creativity and spontaneous play, and School B, characterized by formal teacher-directed activities, now commonly referred to as "academic" in focus. Despite Gardner's findings in favor of School A, the debate over curriculum and methods resumed barely a generation later.

In the last twenty years similar empirical comparative studies have been reported (See for example Consortium for Longitudinal Studies, 1983; Schweinhart, 1994; 1997; Schweinhart & Weikart 1992; Marcon, 1992; 1995). The results of these studies have been somewhat mixed, though generally close to Gardner's earlier findings to the effect that those children enrolled in preschools on the constructivist side of the dichotomy fare better in school *in the long run*, especially the boys (Miller & Bizzell, 1983; Marcon, 1992).

Developmentally Appropriate Practice

One of the most recent best known and concerted efforts to put the longstanding curriculum and methods controversies to rest was the 1987 position taken by the National Association for the Education of Young Children (NAEYC). The position statement, titled *Developmentally Appropriate Practice* (DAP for short), was well received, especially among practitioners. However, among scholars in the field it engendered still further debate and discussion, especially concerning cultural and ideological issues (see Spodek, 1988; Delpit, 1988, Jipson, 1991; Lubeck (1992), Fleer, (1995). In response to these critiques, a revised edition of DAP was published in 1997 (Bredekamp and Copple). Expressed in terms of what was deemed *developmentally* appropriate (Bredekamp, 1987), the document does not offer a curriculum or set of teaching methods. Its purpose is to take a position on the controversies surrounding early childhood practice by suggesting that the appropriateness of curricula and teaching methods for young children should be based on what is known about normative patterns of young children's development and individual variations within them.

The "Both/And" Position. Of special relevance to this discussion is that among the major revisions in the second edition of DAP is the attempt to eschew the dichotomous "either/or" polarized approach to curriculum and teaching methods in favor of a *"both/and"* approach. The document lists nine examples of ways that early childhood practices should incorporate *both* sides of the traditionally contrasting models or approaches (See Bredekamp and Copple, 1997, p. 23). However, as shown in the results of a study of contrasting curriculum models by Marcon, (1992; 1995), empirical studies surprisingly fail to demonstrate the benefits one would expect of the kind of "best of both worlds" curriculum strategy advocated by Bredekamp & Copple (1997). One would expect, as by Alexander, Murphy & Woods (1996), that a curriculum incorporating both the constructivist and instructivist goals and practices would yield the potential benefits of both of the approaches, and would, therefore, outperform either extreme. Why this potential advantage has not been shown is not clear.

The Risks of Polar Positions. One of the major concerns about this historical squabbling over goals and methods is that polarizations or dichotomies may, albeit inadvertently, cause us to overlook third, fourth, or more other options besides the two in opposition. In other words it may be that both sides in the enduring struggle overlook curriculum and teaching methods beyond the traditional dichotomy. Years of experience of observing early childhood classrooms suggest to me that both sides under-emphasize and under-value a third option: namely, curriculum and teaching methods that address children's *intellectual* development as distinct from the instructivist emphasis on *academic* learning and the *anti-instructivist* emphasis on children's play and self-initiated learning. Though constructivist theory does not in any way urge adherents to neglect intellectual development, it seems often to be interpreted to imply that, since children "construct their own learning," adults have little more to do than set out a range of nice activities children generally enjoy while studiously avoiding formal instruction in basic academic skills.

Indeed, it is not surprising that those observers of nonacademic preschool and kindergarten classes who have little knowledge of young children, (e.g. E. D. Hirsch, Jr., 1996) criticize "progressive" and "constructivist" classes as banal, vacuous, overemphasizing play and fun, and wasteful of children's capacities. A fairly typical example of such a class is described below.

> Some years ago I visited an early childhood program specially provided for children of low income families. The program was in a region of our country best known for its dairy farming and dairy products. It just happened that the visit occurred in mid-March. On entry into the classroom for four-year-olds, I noted that all were engaged in a task that

> involved them in pasting cotton balls onto a picture of a smiling lamb (with long eyelashes too!). It surprised me to think that there might be sheep farming in the area; but, as it was the first week of spring, it seemed possible that the children would have been alerted to the sheep and been taken to see some lambs. Thus I asked one of the four-year-old boys "Have you been to see some lambs?" When he said "No," I asked him "Well, why are you doing this then?" After a brief period of reflection, he responded, "Because lambs like to march."! Thus he made the best sense he could of the activity, having been told the previous day that spring comes in like a lamb and goes out like a lion!

This is one example of many observed over the years in which young children are offered activities that, while not as mind-deadening as many academic exercises of discrete disembedded skills, also fail to be as intellectually challenging or mind-engaging as the constructivist position would recommend. Indeed, if E. D. Hirsch, Jr. identifies the kind of activities described above as "progressive" education, we can perhaps begin to understand his advocacy of formal instruction in what he believes constitutes an essential "core" of cultural knowledge (Hirsch, 1996b).

I begin the present exploration of the issues by outlining the main distinctions between the intellectual and academic goals and activities and follow with a discussion of their implications.

Academic and Intellectual Goals and Activities

Academic Goals and Activities

During a period of about twenty years, the term *academic* has come to denote those parts of the early childhood curriculum intended to help children master the basic skills involved in literacy and numeracy (Jacobsen, 1996). Several factors may account for increasing pressure in the US and elsewhere to launch children into mastery of academic knowledge and skills (e.g. in literacy and numeracy) as early as the preschool and kindergarten years.

One factor is the increasing demand and widening expectation that preschool and kindergarten programs ensure children's readiness for the next school setting and the next grade. This "push down" phenomenon is a traditional tendency at every level of education to push down the expectations and curriculum from older to younger children. For example, today's high school economics was yesterday's college course, and today's middle school geography concepts were very likely taught in high school fifty years ago, and so forth.

In early childhood classes with a strong academic focus, an instructivist approach, the teacher's role is that of expert and the role of the child is passive and reactive, rather than the active and interactive one expected and assumed by the constructivist approach. Doyle

(1986) states that academic goals that are addressed by direct instruction "are defined by answers students are required to produce" (p. 177). They frequently involve memorizing lists or symbols, responding to questions that have correct answers, and practicing routine tasks that can be specified and assessed as right or wrong, correct or incorrect.

Another consideration is that the traditional importance given to spontaneous play as the natural way that children learn may be less convincing today; a half a century ago opportunities and artifacts for play, especially in the home, were considerably less plentiful than today for the majority of children.

Academic Tasks. Academic tasks are typically carefully structured, sequenced and decontextualized small bits of information and discrete skills that often require some small group or individual instruction by a knowledgeable adult. They also include exercises designed to help achieve mastery of them. The academic tasks in the early childhood curriculum usually address facts and skills that the majority of children are unlikely to learn spontaneously or by discovery, though under favorable conditions, many children do so. For example, under the right environmental conditions, many young children can "pick up" the names of colors and shapes and need little in the way of didactic or systematic, formal instruction to learn them. As in the case of acquiring phonemic awareness, academic goals address items of knowledge that have to be practiced and remembered. These items of knowledge may be spontaneously constructed by some children, as can be seen in invented spelling; but in such cases they are largely mis-constructed and require assistance to re-construct correctly.

Similarly, the alphabet, an arbitrary sequence of symbols developed over a long period of human history, has no inherent discoverable logic. It has to be mastered with the help of knowledgeable others who encourage frequent repetition and who correct errors until mastery is achieved. In the case of most young children, it would be wasteful and inefficient for them to have to "discover" such things as the alphabet, or punctuation rules, the pledge of allegiance, the national anthem or other conventional knowledge by self-initiated discovery processes.

Much of the current contentiousness between the instructivists and constructivists, however, is about the extent to which formal academic instruction may be appropriate or necessary for those young children whose early environments do not provide sufficient experiences for spontaneous informal learning of basic things like the alphabet, the names of colors and shapes, etc. However, as indicated below, longitudinal studies comparing instructivist and constructivist approaches suggest that the early gains of children in the instructivist preschool curricula do not last more than a year or two.

Intellectual Goals and Activities

While academic goals address small units of knowledge and skills, intellectual goals address dispositions, i.e. habits of mind that include a variety of tendencies to interpret experience (Katz, 1993). The intellectual dispositions include the disposition to make sense of experience, as noted in the example of the child's understanding of lambs liking to "march." The dispositions to theorize, analyze, hypothesize, and synthesize, to predict and to check predictions, to find things out, to strive for accuracy, to be empirical, to grasp the consequences of actions, to persist in seeking problem solutions, and to theorize about cause-effect relationships, to predict others' wishes and feelings, and many others are all intellectual rather than academic in focus.

It is reasonable to assume that the most important intellectual dispositions are in-born in all humans and are likely to be fairly robust in very young children, though, as in almost all human characteristic, the strength of these dispositions vary from one individual to another. For example, the dispositions to make sense of experience, to be curious, and to be empirical can be observed in virtually all very young children, regardless of family income and environment. Indeed, one of the hazards of living and working with toddlers is that their powerful in-born dispositions to be empirical could lead to their self-destruction if their supervision is not sufficiently vigilant!

The Risks of Neglecting the Intellectual Dispositions

While the manifestation of some intellectual dispositions is likely to be provoked and supported in both academic and nonacademic curriculum models, they deserve explicit attention in the curriculum planning and teaching methods for several reasons outlined below. In other words, to capitalize on and to strengthen these in-born intellectual dispositions, early childhood curriculum and methods must provide contexts in which they can be manifested, appreciated, and thereby further developed.

Mindless Activities in Early Childhood Classes

As suggested above, one of the major issues in the constant wrangling over curriculum goals, methods, and now standards or outcomes is that just because young children are not offered the formal academic instruction characteristic of the instructivist position does not necessarily mean that their intellectual dispositions are sufficiently addressed. In many nonacademic early childhood programs, children spend much time on relatively mindless activities such as cutting and pasting pre-cut Valentine hearts, and in group discussions about favorite pets from which the majority of the participants withdraw psychologically within minutes. While such activities are not advocated by the constructivists, providers of such programs may believe that they are appropriate and beneficial because they do not inflict premature formal instruction on young children. Some rationalize these activities on the basis of their being "fun." While such activities do no harm and may be beneficial in a few ways, they lack sufficient intellectual vitality to support or strengthen the intellectual dispositions.

Recovery of Lost Dispositions.

As suggested earlier, it seems reasonable to assume that the major intellectual dispositions are inborn in all children. However, unless the curriculum provides contexts in which the intellectual dispositions can be behaved and strengthened by being used and applied meaningfully, they may be weakened or even lost. If they are lost they may be very difficult to reinstate. In other words, unless they are expressed and supported with sufficient frequency, they may be weakened and, again, may be very resistant to re-learning. Sometime ago Margaret Donaldson (1978) noted that all children seem to begin their school experiences with eagerness to find things out and to pose questions, to do what is asked of them in school, and that "The problem then is to understand how something that begins so well can often end so badly" (p. 14).

The Damaged Disposition Hypothesis

Observation of children in a wide variety of academically oriented programs confirms the fact that young children *can* engage in formal lessons and academic exercises designed to instruct them in basic skills such as phonics, counting, and handwriting, and often do so quite willingly. But the extent to which they *should* do so must be evaluated in light of the potential cumulative effects that these exercises may have on the development and strengthening of the dispositions to use the knowledge and skills. I am suggesting here that it is useful to distinguish between having reading skills and having the disposition to be a reader, and both of these goals must be addressed in selecting curriculum and teaching methods. In this sense, we are obliged to take into account the potential cumulative effects of early experiences, no matter how benign they appear to be at the time they occur, on long-term developmental outcomes.

I suggest that a strong academic instructivist approach may undermine the disposition to use the very knowledge and skills so intensely instructed. Indeed, there is reason to believe that early instruction in and mastery of phonics or arithmetic may be obtained at the risk of undermining the dispositions to use the learnings. Note here again the useful distinction between having reading skills and having the disposition to be a reader. I am suggesting that the disposition to be readers or, similarly, to be ready users of mathematical concepts and skills may be damaged by premature instruction, given the amount of drill and practice usually required for success in mastering these skills at an early age. This concern can be referred to as the *damaged disposition hypothesis* (Katz, 1985).

Longitudinal Studies. The damaged disposition hypothesis seems to be a reasonable interpretation of the results of several longitudinal studies (Karnes et al., 1983; Marcon, 1993,. 1994; Miller & Bizzell, 1983; Schweinhart et al., 1986a; see also Walberg, 1984; Consortium for Longitudinal Studies, 1983). As we look at the results of these studies, the early pressure on young children to perform academic tasks taught by direct instruction (e.g., practice in phonics, workbook exercises) appears quite harmless or even beneficial at first. Certainly many of the children *can* perform the tasks involved.

However, on the whole these studies suggest that, while formal instructional teaching methods during the preschool and kindergarten years may appear to be beneficial in the *short term*, they show negative effects on academic, intellectual and social development in the *long term* (Schweinhart, 1997, Schweinhart and Weikart, 1997, Marcon, 1992, 1995). In particular, the long term follow-up studies of children in High/Scope's Perry Preschool Program, (see Schweinhart, 1997) and the follow-up studies of Marcon, (1995) indicate that in the long term children benefit greatly academically, intellectually, and socially from early childhood programs that provide opportunities for them to take initiative and to be actively engaged in their own learning experiences. Marcon (1995) refers to the long-term negative effects of early formal direct instructional programs as the "Fourth Grade Slump." Marcon summarizes her findings as follows:

> The negative impact of overly academic early childhood programs on achievement and social development was clearly apparent by the fourth grade. Children who had attended [Academically Directed] prekindergarten programs were scoring noticeably lower in fourth grade despite their adequate performance on third-grade standardized achievement tests. The [Academically Directed] children were also developmentally behind their peers and displayed notably higher levels of maladaptive behavior (i.e. defiant behavior, anxiety, and distractibility) (Marcon, 1995, p. 19).

Furthermore, the constructivists emphasis on young children's need to take an active role in their learning may be especially important in the case of boys. Marcon points out that:

> In general, boys do not adjust as well as do girls to didactic early learning approaches. Boys show more stress behaviors in DIP [developmentally inappropriate practice] kindergartens. This is especially true for African American boys in lower socioeconomic status. Development and achievement of inner-city boys are fostered by kindergartens that emphasize socioemotional growth over academics and are hindered by overly aca-

> demic, didactic kindergarten experiences. (Marcon, 1999, p. 359).

Results from these longitudinal studies support the position outlined earlier that curriculum designed for young children should be approached in a way that optimizes the *simultaneous* acquisition of knowledge, skills, *and* desirable dispositions. It is clearly not very useful to have skills if the dispositions to use them are undermined in the process of acquiring them. On the other hand, having the disposition without the skills is also inconsistent with the goals of education. The challenge, then, is to help the learner with both the acquisition of skills and with desirable dispositions that invoke the application of those skills.

In sum I am suggesting that an appropriate curriculum for young children is one that addresses the acquisition of academic skills in such a way that the dispositions to use them are also strengthened. A robust disposition to be a reader can serve all of the intellectual goals of education throughout life. Experience of working with teachers who implement the "project approach" as part of their curriculum suggests that projects offer opportunities for both important skills, the dispositions to use them, and intellectual development (Katz & Chard, 1989).

The Process versus Product Dichotomy.

In is not unusual to hear early childhood (and other educators) value the processes in which children engage more than the products that result from them. This is another and related dichotomy in education that may prevent us from noting a third, or other position on the matter. I suggest that it is not very beneficial for children to engage in desirable processes, e.g. investigations, if they are focused on poor, shallow or worthless content and if they lead to products of low standards. Similarly, it seems unwise, as well as unnecessary, to offer children rich content via inappropriate processes, regardless of the quality of the products. The same can be said of good products resulting from poor processes that also address poor or silly content. In other words, an appropriate curriculum for young children should address *with equal care*, the nature of the processes employed, the value of the content addressed, and the quality of the products (See the appendix describing a project that addresses process, content, and product effectively).

Curriculum Components that Support the Development of Intellectual Dispositions

An appropriate curriculum thus includes ample opportunity for strengthening and using the dispositions, plus good processes about rich content, resulting in high quality products. For these reasons many of my colleagues and I have been helping teachers to incorporate project work into the curriculum (Katz & Chard, 1989, Katz, 1994; Beneke, 1998). Excellent examples of meaningful long term projects in which children's intellects as well as growing academic skills flourish can be seen in the work of the children in the preprimary schools in Reggio Emilia as, for example, reported in the book, *Shoe and Meter,* (Reggio Children, 1997), as well as in reports of projects like Beneke's *Rearview Mirror. Reflections on a Preschool Car Project.* These are just two of many examples that show how young children can express their intellectual dispositions in the pursuit of serious topics, *and* apply their emerging and academic skills, *and* generate high quality products simultaneously.

Project work provides contexts not only for the intellectual dispositions involved in the investigations that children undertake; it also provides texts and pretexts for children to make meaningful and functional *use* of the academic skills they are taught during the "instructive" part of the curriculum. Thus we might "trichotomize" the early childhood curriculum so that it is focused on at least a trio of goals: (1) social/emotional *and* (2) intellectual development *and* (3) the acquisition of meaningful academic skills.

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Appendix

All About Balls

A Preschool Project

(Summarized by Lilian G. Katz)

The project approach to early childhood education is one that incorporates project work as one part of the larger curriculum. A project is an in-depth extended investigation of a topic, ideally one worthy of the children's time and energy. Project work is usually conducted in three phases. The first phase includes exploring and sharing the experiences, ideas, and information the participating children already have related to the topic and closes with agreement on what research questions will be addressed by the investigation. The second phase is a period of data gathering, first-hand observations of phenomena related to the topic, interviewing experts, and other information gathering strategies, depending on the ages of the participants. The final phase includes a debriefing concerning what has been found out, bringing the investigation to a conclusion, and preparing reports to be shared within the class as well as with other classes, parents, and others in the community who might be interested in the children's findings.

The summary below of a project conducted by a group of young children is an example of how a teacher was able to incorporate project work in her class even though for various reasons she was unable to take her class outside of the school. Some time was spent on it on most days of the week over a period of about a month.

Phase 1

The teacher began by suggesting to her group of four-and five-year-olds that they ask their families, relatives, neighbors and friends to contribute any kind of old balls to a collection they were making in their preschool class for a study of balls.

Within a week the class had a collection of 36 balls of many different kinds. The collection included tennis, ping- pong, cricket, croquet, billiard, golf, and bowling balls, as well as volleyballs, basket balls, a soccer ball, baseballs, a football, a beach ball, a whiffle ball, and some marbles. One child added a world globe to the collection as well.

As the collection grew, the teacher encouraged discussion about how the balls varied. In the course of the discussion she developed a topical web indicating the many features of the balls in the class collection that could be studied in detail. However, there was some hesitation among the older children in the group about whether the globe was a ball or not.

The issue of the globe led to a discussion about whether a ball was only something to be played with. This led the teacher to bring in some picture books showing the common uses of ball bearings in various simple machines and a discussion of balls serving as wheels on some kinds of chairs. In the course of one of these discussions the teacher introduced the concept of *sphere* and the term *spherical* that many of the children enjoyed discussing and arguing about. The term *circumference* was also introduced into the discussion and recalled by some of the children. The question of whether the (American) football was a ball or not also became a focal point for heated debate.

Phase 2

Small groups of children volunteered to undertake specific investigations to answer the questions generated by the class in discussion with their teacher and indicated on the topic web.

Before the small group investigations were launched, the children made predictions of the outcomes. For example, one group weighed the balls and checked their predictions concerning which of them would be the heaviest and lightest. Their predictions indicated their strong association of size and weight, and their empirical findings yielded further curiosity and discussion. They were not quite ready to grasp the complexity of the concept of density!

One group of children, working in pairs, used string and struggled to measure the size of each of the balls by cutting the string to the length of the circumference. It invariably required several attempts before successful measurement was achieved. Students then displayed the strings by hanging them vertically in serial order on a chart displayed on a bulletin board.

Another small group used blocks and a plank to create inclined planes of various angles down which some of the balls were rolled. At first the children studied which balls would roll the fastest and farthest down the plank and along the floor. Then they conducted the same procedure on the linoleum floor, a carpet, on grass, and on gravel surfaces outside their classroom to observe the differences in the distance of free roll once down the plank. In the course of this exploration and discussion with their teacher, the children enjoyed applying the terms *rough and smooth surfaces* to describe the slowing down of the balls' roll caused by grass and gravel compared to the linoleum and carpet surfaces.

A group of the younger children made rubbings of the surface of each ball. That activity led to a discussion of the variations of surface texture in the collection for the rest of their class. All were surprised at the wide variety of surfaces in their collection.

Another small group created a block structure several feet in height and, using a tape measure suspended from the top of it, predicted and then measured as best they could the height of the bounce of each ball. Contrary to their predictions, and much to their surprise, not all of them bounced!

The teacher engaged the children in a discussion of what might be inside each of the balls, in the course of which she explored with them the terms *hollow, solid, empty,* and *full*. With the exception of the golf ball, all of the balls were opened and their contents examined. The children were unable to open the bowling ball by themselves and succeeded in getting it opened with the assistance of a parent volunteer.

Following the close examination of the properties of the balls in the collection, the children discussed the variety of ways in which balls are used in games. They discussed which balls are struck by bats, clubs, mallets, and racquets, and which balls are caught, thrown, and moved by hands and feet. They also surveyed their parents on which games they played, and which games they enjoyed watching.

Phase 3

In the course of work that lasted about a month, the children engaged in measuring, drawing, reading and creating stories, looking up information in the local library with the help of the librarian and many parents, examining books about sports, and reporting to parents the story of their investigation and their findings.

Many parts of the investigation presented difficulties. For example, getting the strings around balls to measure the circumference and ascertaining the height of their bounce required considerable skill and persistence, both of which were strengthened by the work undertaken. As the children participated in preparing displays of their findings, they asked the teacher to write words that they could copy onto their drawings and charts

This project also provided contexts for analyzing, hypothesizing, predicting, observing, recording and representing research findings. It also provided a setting for extensive discussions, cooperation, individual initiative, and sharing responsibilities, and many other developing intellectual as well as social capacities and dispositions. Children of all cultures and language backgrounds can become deeply engaged in the kinds of intellectual explorations such items in their own environments can provide.

Apple Cutting and Creativity as a Mathematical Beginning

Elisabet Doverborg and Ingrid Pramling Samuelsson

This article describes and demonstrates a teacher implementing "developmental pedagogy" (Pramling, 1994) with five-year-old children in the subject area of mathematics. In this approach to learning, the teacher creates situations and asks questions that challenge children's thinking and enable them to experience various ways of viewing something, from which a metacognitive aspect to the learning also is achieved. Mathematics becomes more than a school subject; rather, it becomes part of the children's perspective of the world, a perspective that includes viewing features of the world mathematically and relating to and talking about these features in mathematical terms.

Sweden has recently adopted a national curriculum for preschool (Utbildningsdepartementet, 1998a) and a revised curriculum for school (6-16 years of age) (Utbildningsdepartementet, 1998b). Both curricula have the same structure of goals, that is, what education is expected to contribute to the development of children. This means that Sweden has adopted the life-long-learning perspective, also seen in other countries' curricula (see e.g. New Zealand, Ministry of Education, 1998). In Sweden life-long-learning is a distinguished perspective focused not only on learning as a means to knowledge, but also as a means to a solid base of values and norms. In addition, the content in terms of qualities (or skills) and an understanding of different aspects of the surrounding world is a common thread woven throughout the entire school system, although on different levels of complexity.

This perspective on learning is based on the idea that "formation of knowledge is an internal relation between the child and the world around him/her" (Marton, 1994). This implies that every child's earlier experiences are used as a foundation for developing a broader and deeper understanding of the specific content dealt with in school-based education. The child's earlier experiences also guide how he or she experiences the educational setting, the teacher's role, what is expected of him- or herself, how to accomplish specific tasks, how to interact socially, etc. Children's earlier experiences also guide the teacher's role. Knowledge formation, therefore, is both content and context dependent and formed from clearly defined perspectives, values and the content of early childhood education, if it is to be beneficial to the child's life-long-learning process (Pramling, 1990, 1994; Doverborg & Pramling,

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1995; Doverborg & Pramling Samuelsson, 1999, manuscript). Implied in this perspective is that young children learn by being active with their bodies and minds and through communication with peers and teachers. Children experience the world emotionally, socially and cognitively at the same time. Therefore the early years lay the critical foundation for the child's interests, which, for example, in mathematics include the value of working in this area, ability to make sense of the topic, and the child's feeling of competence within this topic (Lundgren, 1979). Critical in establishing this foundation is the *role of the teacher.* What teachers do and how they do it makes a difference in children's learning. In the approach to learning called "developmental pedagogy" (Pramling, 1994), the teacher utilizes children's activities, including play and everyday activities, structuring them to produce understanding of a particular content or skill. Additionally, the teacher creates a metacognitive aspect to the learning. Further elaboration of this approach appears in the next section.

The goals specifically related to mathematics in the Swedish curriculum for one-to-five-year-olds state: "The preschool should try to ensure that children develop the ability to discover and use mathematics in meaningful contexts and situations, and develop their appreciation of the basic characteristics of the concept of numbers, measurement and form, as well as the ability to orient themselves in time and space" (Utbildningsdepartementet, 1998a, p. 12).

This article describes and demonstrates examples of achievement of these goals through the process of developmental pedagogy, as we follow episodes of a teacher's work with five-year-olds. First, though, is an elaboration of this process of teaching and learning.

Developmental Pedagogy and Theoretical Principles for Practice

Development Pedagogy (Pramling, 1994) is a phenomenographic oriented approach to learning (Marton & Booth, 1997). This means that it is not the child's level of development as such that is in focus, but, rather, the approach to learning as the key to the development of the child. Education does not, in this perspective, become a question of finding the child's maturity level for appropriate practice (Bredekainp & Copple, 1997), but instead, it is a process to challenge the child's understanding that has grown out of his or her experiences (Pramling, 1994, 1996). Experience here is viewed as the child's understanding—how he or she sees, conceptualizes, discerns or relates him- or herself to the world. Learning is, in other words, *to become aware of different aspects of the world and to create a personal meaning* (Marton & Booth, 1997). Children have an unreflected way of experiencing different phenomena. Teachers can lead children to reflect and, in so doing, challenge and change their perspectives.

To support children in becoming aware and to change their ways of experiencing or discovering new phenomena, variation and similarity become key factors. It is in the experience of diversity that children become aware. This, however, means two things. First, children must experience similarities in the phenomenon or notion the teacher is trying to get children to understand. Similarities mean that particular features must vary, although the phenomenon or notion is the same. The child must, for example, experience "five-ness" in many different ways, such as different objects, patterns, shapes, sizes, and contexts. Second, it is when children experience various ways of viewing something that their own unreflected ways of thinking become challenged, that is, when they, for example, discover that different children have solved the same problem in different ways. It is in the tension between one's own way of thinking and others' ways of thinking that the challenge appears to children.

From this theoretical perspective, the teacher's role is to create situations and ask questions that challenge children's thinking and make the variation visible. To create situations means both putting children in contexts where they have to think and verbalize their thinking. By asking questions, not for getting a right answer but for exploring children's thoughts, the teacher must be thoroughly interested in every child's view. She challenges children by getting them to extend their thoughts in dialogue-like settings. She supports and encourages children to imagine and tell her different things, find more reasons for something, to explain further, etc. (Doverborg & Pramling, 1993).

This approach to learning has been used in other projects in preschool, with great success (Pramling, 1990, 1994, 1996; Doverborg & Pramling Samuelsson, manuscript). In short, the principles the teacher must employ are:

- To focus children's attention and enhance their development about different aspects of the world as selected by the teacher.
- To stimulate children's abilities to imagine, think and reflect about the content.
- To help children express themselves and make their own ways of thinking visible or as a metacognitive aspect (see further Pramling, 1983, 1990). To make children's ways of thinking visible can be accomplished by encouraging children to communicate through drawings, other creative activities, problem solving and verbal communication initiated by the child.
- To then use the diverse ways of thinking expressed in drawings, objects, tasks, or verbal cues as the content. By focusing on a set of diverse options for thinking, children are increasingly aware of the various ways a task could be solved and thus become more aware of their own way of thinking.

These principles will be exemplified in the description of the teacher's work with children.

Description of The Teachers Work

What follows below are examples of a teacher implementing

Developmental Pedagogy. This teacher has a genuine interest in how children can develop a basic understanding of mathematics through play, theme work, and in everyday situations. She says that mathematics in preschool is not a question about formal counting, but about creating situations, using children's different experiences and activities for problematizing, and, in that way, giving children possibilities to test and develop mathematical notions. She consistently begins her work using children's experience as a starting point. During the day, in play, theme work, and everyday situations, she uses the children's experience to make mathematics observable. Children are also asked to document their thoughts and ideas, and in this way the diversity of conceptions becomes visible.

In the following section we will illustrate how the process described above takes place as the teacher uses an ordinary activity of apple cutting and other activities from a project about hens as sources of learning.

Apple Cutting

The teacher is having lunch together with seven five-year-old children. Each child gets half an apple for dessert. Next they are asked into how many wedges and/or small pieces they want the teacher to cut their halves. Although the children have done this since they were three years old, this activity remains very exciting to them. When the children were three to four years old and got a question about how many wedges they wanted to cut the apple into, they often used their fingers. At that time the children were excited about the idea that half an apple could become two, three, four or five wedges. Now, at five years of age, they are fascinated that apple halves could be cut into many more pieces, by cutting each wedge in the middle again. Sometimes the children cut all the wedges in the middle, but sometimes only some of the wedges were cut in the middle. What follows is a dialogue between the teacher and a group of children, about cutting half an apple into wedges and smaller pieces.

Teacher: Now I will ask Karl, into how many wedges shall I cut your apple today?

Karl: I would like to have six pieces.

Teacher: Okay.

Karl: Start by cutting it into four wedges (points to the half apple and someone else's wedges).

Teacher: Four wedges first, okay. Now we will see what it looks like. Four wedges. How will I go about making it into six pieces?

Karl: Five and six.

Teacher: Two of them?

Karl: Yes, two of those wedges should be cut in the middle and that will make four.

Teacher: You mean that out of the four wedges I should take two away and divide them in the middle? Now we'll see, and you want it to be six. Did it become six?

Karl: Now I can count. 1, 2, 3, 4, 5, 6. (Karl points and counts.)

Teacher: Is that right?

Karl: Yes.

Teacher: Ann, how many do you want to have?

Ann: I want six.

Teacher: How should I cut the apple to get six pieces?

Ann: First you can cut it into three.

Teacher: First three, let's try that. (The teacher cuts the half apple into three wedges.) And then?

Ann: Then you cut them all in the middle and there will be six.

Teacher: There will be six then. Are you sure about that? Now we'll see. (The teacher cuts the three wedges in the middle.)

Ann: 1, 2, (pause) 3, 4, (pause) 5, 6. (Ann counts at the same time as the teacher cuts the wedges into pieces.)

Teacher: That is right. Yes! And now I'll ask you, Wilhelm, how many do you want to have?

Wilhelm: First I want you to divide them into four.

Teacher: How many do you want it to be in the end?

Wilhelm: I know, six.

Teacher: Six is what you want, let's try. (The teacher cuts the half apple into wedges and counts 1, 2, 3, 4.) Is that four?

Wilhelm: Yes. (Counts the wedges, 1, 2, 3, 4.)

Teacher: And now how many do you want me to divide?

Wilhelm: Four. (Points at all four.)

Teacher: All of them? Then we will see what we get.

Wilhelm: 1, 2 (pause) 3, 4 (pause) 5, 6 (pause) 7, 8. (He counts at the same time as the teacher cuts.)

Teacher: How many did we get?

Wilhelm: Eight.

Teacher: Yes, think about that, when one divides four into two it becomes eight. Wasn't that exciting? They are yours, all of them. And you Klas, how would you like to have yours today?

Klas: Divide to five and then five again.

Teacher: Five? Should I divide your half into five, okay? I start with five here. (The teacher cuts and counts simultaneously with Klas, 1, 2, 3, 4, 5.) Is it good like that? Then I'll divide them again, and you thought it should be how many?

Klas: Ten.

Teacher: Ten all right. Do you think there will be ten? (Cuts the wedges in the middle.) Klas counts the wedges when they are cut into pieces: 2 (pause) 4 (pause) 6 (pause) 8 (pause) 10.

Teacher: You had solved that problem in your head. How fascinating!

Alex: Is it my turn now?

Teacher: Yes, it's your turn now, come on.

Alex: I think I want ten.

Teacher: Did you say I should cut it into ten wedges?

Alex: Yes ten.

Teacher: What do you mean by ten?

Alex: You should cut them into ten wedges.

Teacher: Should I divide it into ten wedges, what do you want me to do?

Alex: The same as you did for Linus earlier, that kind of wedges.

Teacher: But it didn't become ten then.

Alex: Nine.

Teacher: Do you want it to become nine?

Alex: Ten.

Teacher: Ten. Into how many wedges do I need to cut the half apple?

Alex: But it should be ten like that.

Teacher: Do you mean I should begin by making ten wedges, okay.

Alex: And then I think it will become 20.

Teacher: Now I start. Look here, how thin the wedges will be if I should cut the apple into ten wedges. (The teacher cuts and counts 1, 2, 3 and says to Alex "You have to count." The teacher continues to divide while Alex counts.)

Alex: 4, 5,6,7,8,9,10.

Teacher: I think we have to spread them out in some way.

Alex: Take the seeds away.

Teacher: I'll do that. That's better. Will you put them into order?

Alex puts the wedges into a line while he counts them, 1, 2, 3, 4, 5, 6 and continues in the same way by a new line, 7, 8, 9, 10.

Teacher: What do you want me to do now?

Alex: Divide them like that, I think it will become 20.

Teacher: Okay. (Divides wedge by wedge at the same time as Alex counts.)

Alex: 1, 2 (pause) 3, 4 (pause) 5 , 6 (pause) 7, 8, 9 (pause) 10, 11, 12 (pause) 13,14 (pause) 15,16 (pause) 17,18 (pause) 19, 20 (pause) 20, 22 (surprised).

Karl: You counted wrong!

Teacher: Do you want to count them once again to see if you will get another number?

Alex: (Points and counts again.) 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19. (He did not point to a couple of pieces in the beginning and counted 10 twice.)

Karl: You missed something.

Teacher: Should we count together? (The teacher and Alex count every single apple piece.) 1, 2, 3, 4, 5, 6, 7, 8, 9,10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. (Many of the children count with them.) How many did it become in the end?

Alex: 20.

Teacher: How nice, it became what you thought it should be.

Alex: I knew that from the beginning.

Teacher: Good, good! You knew it from the beginning. Now, all have had their apple cut.

From this dialogue we can see how the teacher interacted with the children. She initiated mathematical problems ("How should I cut the apple?'), furthered the solutions ("How many do we get?"), extended learning and stimulated thinking ("Yes, think about that, when one divides four into two, it becomes eight."), and acknowledged accomplishment ("You had solved the problem in your head. How fascinating!"). She let the children try their own ideas in different ways. The children's alternative answers and the various ways to solve the problem became visible, even though the teacher did not put the variation in focus right away.

On different occasions the children draw a picture of how many wedges or pieces into which they cut their apples. All the pictures are then discussed and the teacher makes the children aware of the different ways the apples have been cut that day. Each child's picture is then put up on the wall next to a photo of that child. Over time each child has many different pictures of apple cutting close to his or her photo so that the individual's own different ways of solving the problem can be seen. In this way children can also see their friends' different ways of cutting an apple.

Below is a description of another occasion when the children gave different suggestions and illustrated the cutting of their half apple. Nine children were sitting together with the teacher, and each one of them has solved the problem of cutting the apple differently, as can be seen in Figure 1.

Although the children were sitting together both when they were cutting and illustrating the cutting, we can see from their drawings that all of them have chosen different ways to illustrate the cutting. Since they recognize that the teacher has a genuine interest in their thinking, the children feel secure and try to get their own apple cut in different ways. They try to invent new ways. The illustrations show that the nine

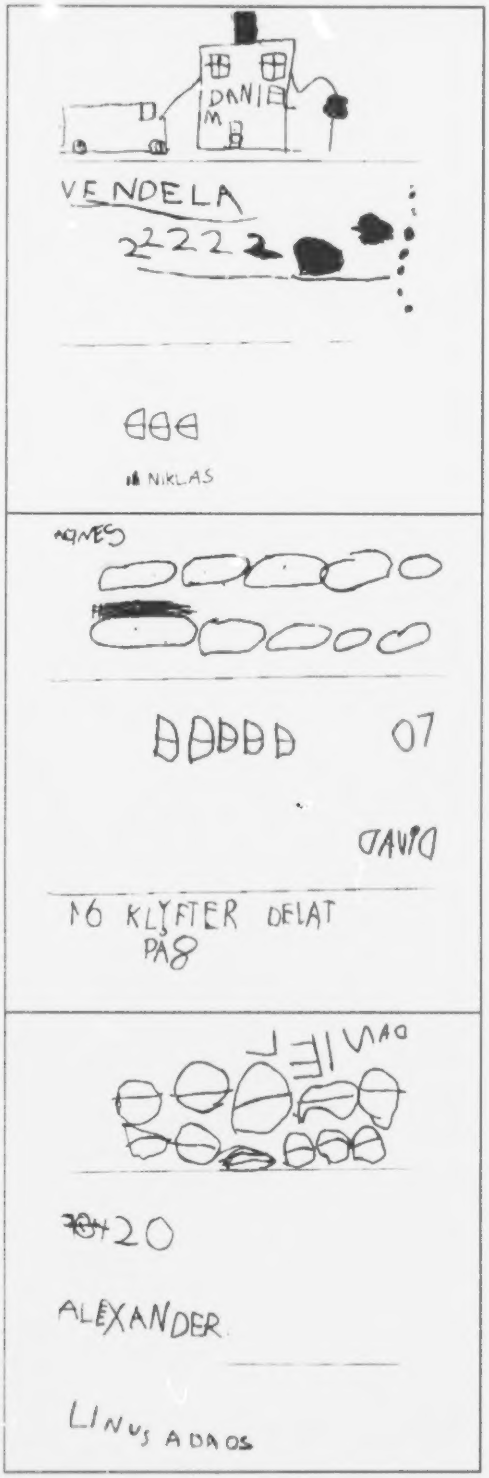


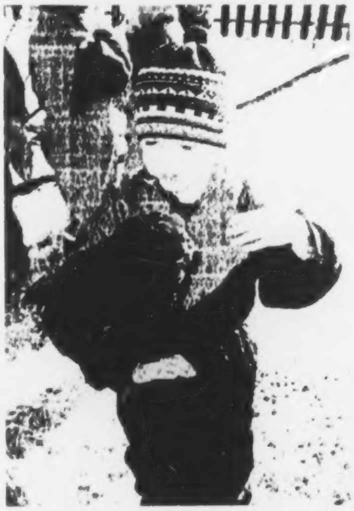
Figure 1. Children's illustrations of the apple cutting.

children have divided their apples in five different ways. Daniel did not want any fruit that day; on the other hand, he wanted to document that he did not have any apple. He has drawn a car which comes and picks all the apples from the apple tree, and he has also written a zero at the door to show that he did not have any apple that day. Vendela wanted her half apple in two pieces, "that is two fourths of the apple," she commented. Niklas wanted six pieces, but first the half apple is cut into three wedges, which he then had cut in the middle to get the six pieces he wanted. David and Agnes both wanted to have ten pieces, but they wanted to cut them in different ways and still have ten. David started to divide the half apple into five wedges, which then were cut in the middle to get ten apple pieces. Agnes wanted to have her apple cut into ten thin wedges from the beginning. The children compared and found out that Agnes's wedges were only half as thick as David's wedges. However, Agnes thought that her wedges were twice as large as David's, but after a while she found out that there was as much apple in both parts even though it looked different. Karl was fascinated that the wedges could be divided in the middle. He said he wanted 16 pieces, but first the half apple should be divided into eight. He got eight wedges, which then were cut in the middle into 16 pieces. The children found out that Karl's 16 pieces were thinner than David's ten pieces. Finally Linus, Daniel, and Alexander wanted to have 20 pieces. All of them first wanted their apple divided into ten wedges and then to have the wedges divided in the middle to get 20 pieces. Once again the children compared each other's apple cutting and found out that the 20 apple pieces were even thinner than the 16 of Karl's. From the children's documentation, we can see how they illustrated the cutting in different ways, either by writing the number of apple pieces in numerals or by drawing the pieces. There were also children who both drew their cutting and wrote the numbers.

The teacher has, in these examples of systematically cutting apples, used a recurring everyday situation to make basic mathematics notions visible to the children. We have followed how the children solved, for them, meaningful everyday problems by using informal strategies. The children *have experienced* numbers, the number word sequence, numerals; the concepts of less/more, dividing, doubles, half/whole, one-third/one-fourth; and aspects of time (yesterday, during a week). As the children tried and tested different ways to divide their fruit, they were given opportunities to gain confidence in their own way of thinking—one of the preschool's most important goals. Their attention was also focused on the diversity of ways of solving one and the same problem.

Creativity in Theme: Hens

The preschool curricula included the study of animals. The five-year-olds studied chickens, which, after a while had grown into hens and were moved to a fenced poultry house built in the preschool's yard. Once a week each group of children took care of the hens, and on Fridays children cleaned the poultry house. For a couple of months the five-year- old children were working with the theme Hens. The children started by studying what the hens actually look like and later compared this information with a book of facts about animals. The children drew pictures of a hen, which constituted a visual starting point for the continuing work with the theme. The sketch helped the children estimate how large a real hen is, the length of its neck, the shape of the beard and crest, the width and length of the beak, and the color of the eyes. (See Figure 2.) The children wanted to make hens in a realistic size, but they also wanted them to be the right size to be placed on a special shelf where their constructions were displayed. (See Figure 3.) Since the children wanted their hens to fit these criteria, they had to measure very carefully, including measuring the material (net) for the construction.



(Figure 2.) A boy estimating the size of the hen.

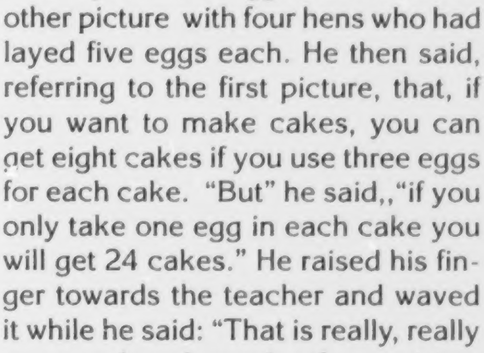
(Figure 3.) Calle's created hen on the shelf

Later when they finished their constructions, the children gathered together to view and compare their hens. They discovered that they did not use the same color. The teacher then asked: "Which are there more of, black or yellow hens?" "The black ones," shouted the children. "How many black hens are there?" asked the teacher. Karl then said: "There are twelve children who have made one hen each and then Marja (the teacher) has made one hen so that will be 13 all together." Karl said further: "Linus and Alex have made yellow 'teenage girl hens' and that makes it eleven black hens." The teacher wondered how he could be so sure that it was eleven black hens. "Easy" said Karl, and counted backward " 13 and 12 is yellow. Take them away. Then there are eleven. Easy like that." Another child, Anna, who was not totally clear about Karl's counting, wanted to count every hen one by one, row by row, where they stood on the shelf But she also wanted to touch each of them when she counted. When Anna finished counting she agreed that there were eleven black hens. The children also made comparisons between the width, length and height of the hens' crest, beak, neck, and other parts.

The children in this group had many challenges and opportunities to solve different mathematical problems. The teacher had as a goal for the children to develop their capabilities to discover and use mathematics in a meaningful context, as the curriculum states.

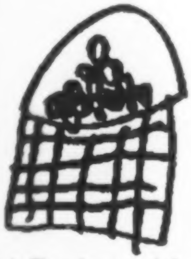
In many different ways the children show that mathematics is a part of everyday life. One day Alex suddenly wanted to invent and solve different problems. He made two different pictures, one with eight hens who layed three eggs each and another picture with four hens who had layed five eggs each. He then said, referring to the first picture, that, if you want to make cakes, you can get eight cakes if you use three eggs for each cake. "But" he said,,"if you only take one egg in each cake you will get 24 cakes." He raised his finger towards the teacher and waved it while he said: "That is really, really many cakes. I wonder if we get two each then?" He sat pondering over the other picture and said that you can make:

Four cakes with five eggs in each.
Two cakes with ten eggs in each.
One cake with 20 eggs.
Ten cakes with two eggs in each.



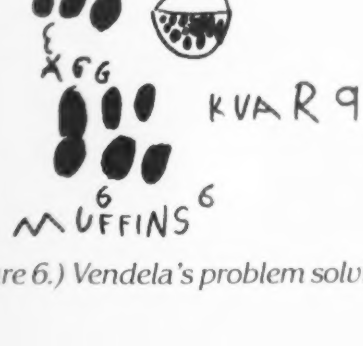
(Figure 4.) Alex's illustration of the number of hens and eggs.

Alex does not count but "sees" how he can divide the eggs in different ways. The children in the group often invent different problems, which their friends then have to solve. Here Alex has made up one problem, which his friends have to try to solve.



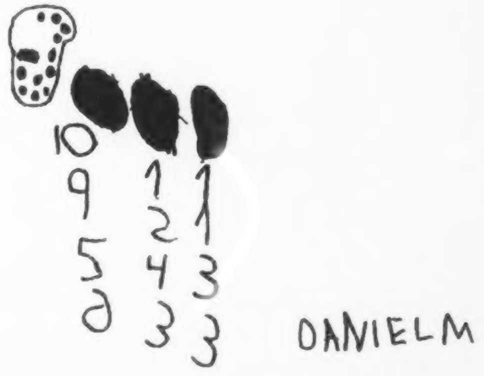
(Figure 5.) Basket with eggs.

He presented the problem by saying: "You get a basket with twelve eggs, what will you make of them?" The group of children drew, wrote, and used figures to show how the eggs could be used in different ways. Many of the children gave a suggestion such as "You can use two eggs for each cake and then you will get six cakes." This is what the children had experienced, since they often made a kind of cake with two eggs. Vendela said that she makes a cake with three eggs. She wrote that she has nine eggs left, and with them she will make six muffins. (See Figure 6.)



(Figure 6.) Vendela's problem solving.

Daniel said: "I make a big cake with ten eggs and a small cake with one egg, and then another one. Then I take away one egg so there will be nine eggs and two and one egg. You can also take five plus five which makes ten, but that cannot be the same so I take five, four and (looked again at his fingers) three." He looked at his fingers and said: "Now I move one and there will be six, three, three. Easy, for three plus three is six." Daniel did not care too much about what he should use the eggs for but focused on the phenomenon of dividing, which interests him the most that day.



(Figure 7.) *Daniel's problem solving.*

The teacher organized the children into groups of four to tell each other what they had made out of their twelve eggs and how they had divided their eggs in different ways. By using this strategy, the teacher will discover each child's way of thinking, their ways of counting, their concept of dividing, in what way they can express what they have done, etc. In this task, as in most others in this group, there is no right or wrong answer, but only possibilities and a large variation. The teacher makes the children aware that they have divided the twelve eggs in ten different ways.

The variation in the children's way of thinking about dividing the eggs could be used as a starting point for developing the children's abilities to solve problems in different ways. By realizing the manifold ways of solving problems, they become aware of their own way of thinking. Sometimes it is the teacher who formulates the problem, other times it is the children who create the problems. They continuously solve problems from situations in everyday life or from their own invented fantasy problems.

The teacher has followed an approach to learning that is based in theories that are concerned with the child's experiences, communication possibilities and not with general stages of development (See e.g. Sommer, 1997; see e.g. Spodek & Saracho, 1999). She works consciously towards the goals of the curriculum, and she uses the principles of Developmental Pedagogy described earlier (Pramling, 1994). The teacher does many activities, but always in connection with *reflections and problematizing* topics of relevance to the understanding she wants to develop.

Summary and Conclusions

Although this article is about teaching basic mathematics, the source for it is the tradition of preschool in using everyday activities, play, and creative work for helping children to see and become interested in mathematics. The teacher's approach described here is focused on phenomena of interest and meaning to children, which she uses for making mathematical concepts and ideas apparent (Doverborg & Pramling Samuelsson, 1999). This means that the base is not only mathematics just as a school subject but, rather, as also a part of the children's perspectives of the world around them, a perspective that includes viewing features of the world mathematically wherein children relate to and talk about the features in mathematical terms. When children are allowed to explore their world, they also get possibilities to experience mathematics. This, however, demands that the teacher is able to see mathematics in the surroundings and to structure activities that enable children to explore and verbalize mathematically. For children to comprehend and use mathematics, it is necessary for the learning situation to be an ongoing interaction between sensitive, knowledgeable teachers and children who are, or become, interested in discovering mathematical relations in their world.

To begin with everyday activities, play, and creativity as the starting point does not, of necessity, lead children to develop an understanding of basic mathematical notions. Teachers must use and express these mathematical notions when they, together with children, describe what the children experienced and discovered (Koirala, 1999). Many researchers like Hughes (1986) point to the importance of getting children to start with known and context-related tasks when they count and solve problems. All learning should not only use children's experiences as a starting point but also needs to include how they experience the phenomenon in focus.

In this article we have followed a teacher with a developmental pedagogical perspective (Pramling, 1994) on learning basic mathematics. She gave children challenges and the attitude was positive and supportive. She never said that anything was wrong or corrected anyone (see Wilhelm p. - 91). But, at the same time as she followed every child's ideas, she knew which concepts or ideas she wanted to develop in the children. She has a clear conception of what basic mathematics is and how she can work and consequently make it visible to children. We can, therefore, see in the previous descriptions how this teacher's competence, goal orientation and approach to teaching influences children's learning of mathematics, something also shown in other studies (Neuman, 1987; Doverborg, 1987; Kihlstrom, 1995; Carroll, 1999).

Neuman (1998) says, with support from Ginsburg's (1977) model for informal and formal mathematical knowledge, that it is most important to give young children informal knowledge. Ginsburg distinguishes three different kinds of knowledge that he calls "systems." "System-1-knowledge" is informal and natural knowledge, which he means is universal. "System-2-knowledge" is informal and cultural knowledge, which is formed outside school. "System-3-knowledge"is formal and cultural knowledge, which is transferred from generation to generation through school education. Neuman says that if children have not developed informal knowledge, they cannot take on formal knowledge. She claims that it is of importance both to teachers and to parents to have an understanding of the way "system-1 and system-2" knowledge develops for laying the base for mathematical development. This knowledge develops in everyday life, in what we do together with children. Neuman claims that we often are unaware that, as we do things together with children in everyday life, we are establishing *the most* important base for children's mathematical development.

Vygotsky (1972) points to the fact that one should not try to force children into scientific concepts, but let them develop their own everyday ideas about science. This is what our teacher expresses, since she communicates about mathematics in the children's everyday life and connects it to their experiences and interests. By problematizing the apple cutting, children were given many opportunities for informal encounters with mathematics. We can also see in the children's illustrations of their apple cuttings and theme problem solutions that they expressed numbers by drawing pictures, writing numerals, or writing text, expressions that both Sinclair, Siegreist and Sinclair (1983) and Hughes (1986) found in their research.

Children continuously meet different mathematical problems in their everyday life, which they solve themselves by informal strategies. Sometimes they invent solutions in their heads, other times they use their fingers (Ahlberg, 1997; Fuson, Perry & Kwon, 1994; Neuman, 1987;

Doverborg, manuscript). They also use objects or paper and pencil as a support for solving a problem. Ahlberg (1994) says that children's ways of solving problems are intuitive and based on earlier experiences, which is quite different from the more formal strategies later taught in school. She states further that children first must have a chance to create their own symbols and later be able to develop an understanding of the mathematical language.

As children spend their time in a milieu where reflection and problematizing is part of life, they also make that approach their own. An example is when Aiex (p. - 97) first invents a problem for himself and then changes the formulation to become a problem that he presents to his friends. The teacher here catches Alex's idea and uses the opportunity for making mathematical aspects visible—bringing to the children's attention the many ways in which the problem is solved.

Finally, we want to focus the reader's attention on the learning perspective of this article. The role of the teacher has been to make children aware of basic mathematics. The way she has done this is by focusing their attention and getting them to imagine, think, verbalize and reflect. The method she uses is different documentations of children's experiences (Doverborg & Pramling, 1993). By using their diverse experiences, the variation becomes obvious to children. The teacher then focuses the children's attention towards the manifold ideas that will help them become aware of their own as well as other children's views. By expressing their own ways of thinking, the metacognitive aspect of learning is approached (Pramling, 1990, 1996).

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Reading Recovery: A Synthesis of Research and Evaluation Studies on Reading Recovery as Early Intervention for Reading Difficulties

Christine A. Cullen

Reading Recovery (RR) is an early intervention program that has been developed for first graders who score in the lowest 20% on a program-developed diagnostic survey in reading and writing. This article reviews the literature concerning the RR program in the Unites States. Studies examining the effectiveness of the program were reviewed and showed the program's effectiveness for certain students. Studies comparing RR with other programs demonstrated RR was more effective than programs that had been modeled after RR. Results of studies on RR students' maintenance of learning gains were mixed. Some studies showed that significant effects were sustained past the initial intervention; whereas, other studies indicated that, once children were brought up to the average range, progress was somewhat less than the average of their class. The cost effectiveness of the program was reviewed, and studies examining the impact of RR on schools showed classroom instruction was not influenced.

Increasingly more students are having difficulties learning to read and write, and educational personnel have made efforts to implement interventions that ameliorate the problem. Because of the dire consequences that can result when students do not know how to read, enormous amounts of time, money, and energy are spent annually in efforts to remediate reading difficulties. "Children who have difficulty learning to read do less well in other subject areas, have lower self-esteem, pose greater discipline problems in schools, and are less likely to complete a high school education" (Shanahan & Barr, 1995, p. 958).

While enormous amounts are spent annually to help students with their reading difficulties, only a fraction of this funding is spent on preventing reading problems (Pikulski, 1994). Pikulski (1994) reviewed the research and the growing body of literature surrounding this area to find that reading failure is preventable for almost all students. There is widespread belief that if early reading deficits are prevented, then there is less chance that failure will occur and that special interventions will be needed in the later grades (Ross, Smith, Casey, & Slavin, 1995). There is an assumption that accompanies this belief in early intervention: school success is primarily due to reading success, because few children are retained or referred for special education solely on the basis of failure in

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subjects other than reading (Ross et al., 1995). Ross et al. reviewed research that suggests failure to read adequately by third grade is associated with higher risks of early pregnancy, delinquency, high school dropout, and other problems. Efforts to correct reading problems after third grade are largely unsuccessful (Pikulski, 1994). Based on this rationale, early intervention programs have been developed in order to prevent reading (and school) failure. One program that has shown significant promise in helping prevent students from reading failure is Reading Recovery.

Reading Recovery (RR) is an early intervention program that has been developed for first graders who score in the lowest 20% on a program-developed diagnostic survey in reading and writing. Students are selected for participation in RR without regard for intelligence, ethnicity, language development, school history, physical handicaps, or learning disabilities (Shanahan & Barr, 1995). RR is a one-on-one tutorial program in which individual children meet with a specially trained teacher for 30 minutes every day outside of the child's regular classroom. This supplemental program lasts for an average of 12-16 weeks with the explicit goal of helping young readers recover a trajectory of progress towards the development of independent reading strategies (Pinnell, Lyons, DeFord, Byrk, & Seltzer, 1994). Participation in the program ends (discontinuation) when students either: (a) reach a reasonable degree of independence in reading; (b) attain a reading level that approximates the average level of the class to which they are being returned; or (c) spend a certain amount of time in the program, usually a maximum of 20 weeks (Center, Wheldall, Freeman, Outhred, & McNaught, 1995).

Reading Recovery lessons operate within a clearly defined framework (Pikulski, 1994). It is a program that has been organized to provide a student with individualized instruction that starts with what the student can do and moves along at his or her own particular route into reading and writing (Clay, 1993b). RR has been defined as a balanced approach to literacy that helps at-risk students learn to use contextual information and phonological awareness to support reading (Adams, 1990). The program is based on the theoretical view that suggests children learn to read by reading, and, consequently, construct meaning from print (Center et al., 1995; Pinnell, 1989). The teacher plays an important role in helping the student develop these components. As Pinnell (1989) describes: "The teacher works alongside the child in reading and writing, looking for the 'teachable moment,' offering constant encouragement and support, and letting the child know when he or she is doing well" (p. 166). Reading Recovery is based on the idea that as learners are engaged in social activities that support their learning, they will gradually take over the process and become independent literacy learners (Clay, 1993b).

The purpose of this article is to review the research on the Reading Recovery program. First, however, is a brief history of this program and then a brief presentation of the issues and concerns raised in the related literature.

History of Reading Recovery

Reading Recovery was developed by child psychologist Dr. Marie Clay in New Zealand in the late 1970's (Dyer, 1992). The program evolved when, during the course of her detailed studies of how children learn to read and write, she discovered that there were certain children who were having difficulty learning to read (Clay, 1993b; Pinnell et al., 1994). Clay (1993b) designed RR based on the assumption that children learn to read by constructing meaning through social interactions. After the initial field test in New Zealand, many school districts began implementing this program, and it has continued to grow in New Zealand and other countries for the last 22 years (Dyer, 1992).

In 1984, Dr. Clay and colleague, Barbara Watson, introduced RR to the United States through Ohio State University. Reading Recovery was initially established in six Columbus, Ohio public schools (Shanahan & Barr, 1995). The pilot project in 1984 involved 21 teachers, seven of whom were trained as teacher leaders and could train other groups of teachers during the following years (Pinnell, 1989). During the 1985-1986 school year, RR was in its first full year of implementation. Thirty-two teachers were involved in the project, with 20 of them being new teachers in training (Pinnell, 1989). By the end of the 1996-1997 school year, there were 436,249 children reported being served by RR in over 3,241 districts by 15,843 trained RR teachers (L. Edwards, personal communication, July 6, 1998).

Reading Recovery has experienced rapid growth in the past 14 years. Shanahan and Barr (1995) believe, based on personal experience, that many more school districts have developed programs based on the Reading Recovery model, but that require less commitment in terms of time, money, and resources. This amount of growth and acceptance of a program in such a short period of time is unusual and attests to the fact that many American educators see Reading Recovery as a solution to students' declining literacy abilities (Hiebert, 1994).

Major Issues and Concerns

Despite this overwhelming development and the apparent approval of Reading Recovery, many researchers and educators have questions about the program. The types of questions that are being asked about RR can be divided into five major areas: (1) the effectiveness of the program, (2) comparisons of RR with other programs, (3) maintenance of learning gains obtained from RR, (4) cost effectiveness of the program, and (5) the impact of RR on schools.

In examining RR, several researchers have questioned the effectiveness of such an expensive program (Denton, 1997; Dyer, 1992; Shanahan & Barr, 1995). Shanahan and Barr (1995) state:

> The most basic requirement of any instructional program is that it result in learning; not necessarily more learning than would be accomplished by other approaches, but

> more than would be expected if the intervention did not take place at all (p. 965)

Researchers want to know, using this simple standard as a guide, does the RR program help children learn to read?

Along with this, researchers are interested in how RR compares with other early intervention programs for at-risk students (Pinnell et al., 1994; Ross et al., 1995; Shanahan & Barr, 1995). Shanahan and Barr (1995) state that the purpose for making such comparisons is not to propose these programs as alternatives to RR, but to provide a reference for the effectiveness of RR in relation to other successful programs. One study examined how RR compares with variations of the program (Pinnell et al., 1994) and Ross et al., (1995) examined how it compares to other early intervention programs.

Other researchers have investigated how RR students compare with other low-achieving students (Pinnell, 1989) and with students performing in the average range of their class (Denton, 1997). The purpose of these studies has been to discover if RR students perform as well as those who receive instruction only in the regular classroom or with some other form of early intervention. The question here, according to Shanahan and Barr (1995), is whether RR is better than anything else in promoting learning to read during first grade.

Additionally, several researchers have questioned the lasting effects of RR on students (Center et al., 1995; Shanahan & Barr, 1995). Because RR has such high expectations about the stability of gains (Clay 1993b), researchers want to know if this high-quality program produces gains that are maintained in the years following the intervention. As Clay (1993b) states, "Research studies which followed children who had remedial instruction have often reported that progress was not maintained back in the classroom" (p. 59). However, Clay (1993b) reports that for RR children "progress was sustained for most of the children" and that the "numbers of such children [who began to lose their gains] were small" (p. 59). Shanahan and Barr (1995), therefore, think that it is fair to ask whether or not these early gains were maintained in the following years of school. They note:

> The concerns underlying this question are humanitarian as well as economic. Given the limited resources of schools, is it better to make a massive investment early, or to allocate resources more equitably to provide support at various stages of schooling? (p. 978)

Finally, several researchers have voiced their concerns over how RR impacts regular classrooms and schools where the majority of the students could benefit from additional support (Delicio, Yukish, Brown, & Headley, 1997; Hiebert, 1994; Ross et al., 1995). This is especially a consideration given the amount of resources that are allocated towards RR. On the other hand, Reading Recovery proponents argue that RR is an individual intervention program that cannot specify how a classroom program should work nor is it designed to affect all members of an age cohort (Pinnell, Lyons, & Jones, 1996). Shanahan and Barr (1995) think that the impact of RR on other aspects of schooling has become an issue because of conflicting statements from Clay and several major U.S. interpreters of the program. Lyons, Pinnell, & DeFord (1993) have claimed:

> Those who are considering Reading Recovery can expect that involvement will provoke changes in the system. Every aspect of literacy teaching, commonly accepted practice, evaluation practices and system or political decision making will undergo scrutiny. Teachers will start to look at children and at literacy in new ways; there will be a seemingly insatiable demand for more books for children to read, and not just from Reading Recovery teachers. There may be a feeling of disequilibrium among teachers, a demand for more information and for help in promoting more reading and writing in classrooms. Reading Recovery turns things upside down.(p. 24)

Clay (1993b), however, stated:

> Because it is an individual intervention with only the hardest-to-teach children, Reading Recovery cannot specify how a classroom programme for children of wide-ranging abilities should be mounted. One would not design a classroom program by studying the needs of the hardest-to-teach children. (preface)

Given the seemingly contradictory statements and claims, it is readily apparent why issues of the influence of RR on other aspects of schooling would arise.

Review of the Literature

This review of the literature is divided into two sections. The first section will synthesize the findings of research that examines the RR program in relation to one or more of the five major issues that researchers have expressed regarding the program. Under each of these major issues, the studies are presented in chronological order. All the studies presented are related to research that has been conducted on the RR program in the United States. Research examining the RR program in other countries has been excluded because of the differences that may exist with program implementation in different countries. Shanahan and Barr (1995) caution that the context in which schooling occurs in other countries also has important implications for the effectiveness of the RR program. The second section of the review will analyze the findings of the research for any methodological flaws and problems that exist within the RR program.

Section One: Synthesis of the Research

In this section, the results of studies dealing with the major issues surrounding Reading Recovery are considered. Studies dealing with the effectiveness of the program are reviewed, as well as studies comparing the effectiveness of RR with other programs. Studies dealing with the maintenance of learning gains obtained from RR and the impact RR has on schools are also considered.

In reporting the results from the studies, clarification is needed on students comprising experimental and control groups. In all the studies, the experimental groups were RR students. In some of the studies, there were two types of control groups used for comparisons. One type of control group contained comparable lowing achieving first grade students who may or may not have been assigned to alternative intervention programs besides RR. The other type of control group consisted of randomly selected first grade students whose test scores were used to define an average band of performance for first grade.

Studies Examining the Effectiveness of RR. In 1984, Reading Recovery was first introduced to the United States in Columbus, Ohio through the Ohio Reading Recovery project (Pinnell, 1989). During this pilot year, the purpose of the project was to conduct research to determine how effective the program would be in helping low-achieving first grade students (Huck & Pinnell, 1986). Classrooms from six different urban schools were designated as either program classrooms or comparison classrooms. Program classrooms were determined by agreement between the principal and the classroom teacher, and comparison classrooms were randomly selected. The researchers assigned 55 of the lowest achieving students from the program classrooms to the RR program. Comparison students were the 55 lowest achieving students from the comparison classrooms that did not receive any early intervention support. Children selected for Reading Recovery and the comparison students were tested in October, December, and at the end of the year using the Clay (1993a) Observation Survey and the Stanford Achievement Test (SAT). The results showed that RR students scored higher than comparison students at the end of the year on four of the six diagnostic tests: Concepts about Print, Writing Vocabulary, Dictation, and Text Reading. On the other two tests, Letter Identification and Word Test, there was no significant difference between the groups. RR students scored higher than comparison students on the SAT at the end of the year. The researchers found that at the end of the pilot year, approximately two-thirds of the Reading Recovery students had reached average levels for their groups in reading.

The Reading Recovery program began the first full year of implementation in Columbus, Ohio during the 1985-1986 school year. The purpose of research this year was again to determine whether RR was an effective early intervention program for low-achieving first graders (Pinnell, Huck, & DeFord, 1986). In each of the 12 urban schools that were selected for program participation, children in the lowest 20% achievement group in reading were identified using a combination of the Clay Observation Survey, teacher judgment, and a standardized test. These children were randomly assigned to either RR or to another compensatory program. The compensatory program provided daily service all year focusing on drill and practice of reading skills. This instruction was provided by a trained paraprofessional. In order to provide perspective for comparing both groups of students, a random sample of 102 first-grade students was tested from the project schools on the Clay Observation Survey. These students did not qualify for either RR or the alternative program; therefore, they represent the upper 80% of the population. For each of the six Observation Survey measures, an average band, defined as ± .5 SD above and below the mean of the other classrooms, was calculated (Pinnell, 1989).

After an average of 67 lessons in the RR program, 100 (73.5%) of the 136 children that were served by RR were successfully discontinued; that is, they had attained a reading level that approximated the average level of the class to which they were being returned. These successfully discontinued students were compared with those of the random sample on the end-of-year scores from the Observation Survey. The researchers found that over 90% of the 100 discontinued students met or exceeded the average band on four of the Observation Survey tasks. On all the other assessment measures, Letter Identification, Word Test, Diction, and Text Reading, more than 70% of the discontinued students met or exceeded the average band.

In a study conducted by Baenen, Bernholc, Dulaney, & Banks (1997) in Raleigh, North Carolina, RR was examined for its effectiveness at bringing first graders who were having difficulties with reading up to grade level. The researchers were able to use data collected from students served in the RR program over a four year period. Using the Clay Observation Survey, the researchers examined the extent to which RR students were able to perform within an average band that had been calculated for a random sample of first graders (average band was considered ± 0.5 SD). The researchers also compared the performance of the RR students to a control group of comparable students. In examining the data from the Clay Observation Survey, the researchers found that about half (48%) of the 772 students served by RR from 1990-1994 left the program successfully reading at a first-grade level. They also found that during this time period, 23% of the students served by RR were unsuccessful, and 28% of the students did not receive a full program. The reason for students receiving a partial program was usually due to the fact that they were phased into the program too late in the school year to have time to receive enough lessons. During the four years for which data were collected and examined, RR students were the most successful at reaching the average band in reading performance in 1990-1991. During this school year, RR students showed greater gains than comparable students on several of the Clay Observation Survey tasks. A higher percentage of RR students scored in the first-grade average band than the comparison students.

Denton (1997) conducted a study to assess the effectiveness of the RR program during the 1995-1996 school year in a small rural district in Texas. The researcher examined the extent to which RR was effective at meeting its stated goals in (a) accelerating the rate of progress of first grade students who were performing at the lowest levels in literacy tasks, (b) discontinuing at least 75% of the program participants, (c) achieving discontinuation after an average of 60 lessons, (d) producing participants who were reading at grade level by the end of first grade, and (e) producing participants who were performing literacy tasks within the average range of all first grade students by the end of first grade. Denton, using three of the Clay Observation Survey tasks (Writing Vocabulary, Diction, and Text Reading) and an informal reading inventory, compared RR students to a comparable group of students who were on a waiting list for the program. The achievement of RR students and comparison students were also compared to that of a peer group consisting of all the other first grade students. Comparisons were made using the same four measures of the Observation Survey and the reading portion of the Iowa Test of Basic Skills. Denton found that RR was effective in meeting its first stated goal: helping students to achieve an accelerated rate of growth in their literacy learning and to read accurately and with average comprehension. The researcher also found that RR met its stated goal of discontinuing at least 75% of program participants. In this particular study, 78% of program participants were discontinued. Discontinuation was completed in an average of 54 lessons, which was below the stated goal of 60 lessons. Denton found that the RR program fell short of its goal to produce participants who were reading at grade level by the end of first grade. In this study, only 60% of the RR students achieved that goal. When RR students were compared to a peer group, the program children were below the average range of their peers in three of the Observation Survey tasks and on the reading portion of the standardized test. In this study, the RR program was effective in meeting some of its stated goals, but the program was deficient in raising student achievement to the average level of performance in literacy measures.

Studies Comparing RR with Other Programs. Besides determining the effectiveness of the Reading Recovery program itself, the Ohio State group of evaluators also studied how RR compared to another compensatory program that existed in the Columbus, Ohio public schools (Pinnell, DeFord, & Lyons, 1988). The alternative compensatory program provided trained paraprofessionals to work daily with individuals and small groups on reading skills. Because this program was new to the district and highly regarded, the researchers deemed it appropriate for the lowest achieving students to be randomly assigned to either this program or RR. Reading Recovery children (N = 136) received an average of 67 daily lessons, while comparison students (N = 53) were served daily all year by the paraprofessionals. Using the Clay Observation Survey and the reading portion of the Comprehensive Test of Basic Skills (CTBS), RR students were compared to students in the compensatory program. The researchers found that RR students scored significantly higher than comparison students on all the Observation Survey tasks, and also made greater gains on the reading portions of the CTBS. The results from the CTBS, however, must be viewed with caution in that the numbers of students tested on this measure in the comparison group had decreased by 50% due to continuous absences.

Pinnell, et al. (1994) conducted an experimental study in order to compare the effectiveness of RR with three other alternative programs that used variations of the RR program. Using an experimental design, the researchers randomly assigned 403 low-progress students from rural, suburban, and urban school districts to RR, to three other early literacy intervention programs, and to a control group. The other three intervention programs were comprised of a group RR program, an individualized RR program with much less teacher training, and an individualized direct instruction model. Data were collected and compared for all treatment and comparison groups in October, at the conclusion of the tutorial programs in February, and at the end of the school year in May. Students were compared using the Clay Observation Survey measures of Text Reading level and Dictation, a group administered standardized test of reading achievement (Gates-MacGinitie Reading Test), and an individually administered standardized reading test (Woodcock Reading Mastery Test-Revised). The researchers found that, in comparison to the three alternative treatment groups, RR was the only group for which effects were significant on all outcome measures in February. For those teachers who were using an individualized RR program but with much less teacher training, effects were significant on two of the outcome measures, Dictation and Text Reading. When students were tested in May using the Gates-MacGinitie Reading Test, the results failed to show any statistical differences among the groups. Despite this outcome, the researchers still concluded that RR was the most powerful intervention when compared to variations of the RR model. The researchers reached this conclusion when students were again tested in text reading at the beginning of second grade. At this time, the researchers found that the effects that had been obtained had diminished for all groups except for the RR students, whose gains in text reading were statistically significant.

Ross, Smith, Casey, & Slavin (1995) did a comparison study of the RR program to another early intervention program called Success For All (SFA). SFA is an early intervention program that uses one-to-one tutoring, family support teams, research-based beginning and intermediate reading programs, heterogeneous-ability grouped classes with homogeneous reading groups, and other elements to provide support for all students in the elementary school. The researchers decided to question the relative strengths and weaknesses of these two programs because of the demonstrated success and increasing nationwide dissemination of both programs. The researchers were interested in finding answers to many questions, one of which was how the two programs compared on influencing children's reading performance. Using a quasi-experimental design, the researchers compared 184 first grade students from three different rural schools. Two of the schools implemented the school-wide program SFA, while the other school implemented RR. Students from the SFA schools (N = 108) were compared to the RR students (N = 76) on four different reading scales selected from two nationally standardized reading tests (Woodcock Reading Mastery Tests and Durrell Analysis of Reading Difficulty). The researchers found that RR strongly benefited tutored students and that SFA benefited nontutored students. This outcome was to be expected given that RR concentrates on tutoring a targeted group of students; whereas, SFA provides a comprehensive program involving all students. The researchers found that RR students tended to outperform SFA students on reading comprehension, while SFA students performed better on word attack skills. The researchers found that each approach had strong positive effects on students' reading performance for the designated group of students: tutored first graders in RR and all students in SFA.

Studies Examining Students' Maintenance of Gains. The most comprehensive studies on the maintenance of early gains made by students in the RR program are by Pinnell and her Ohio State colleagues (DeFord, Pinnell, Lyons, & Young, 1988; Pinnell, 1989) in the Columbus public schools. In the Pilot Year study (1984-1985) described earlier, the researchers followed the progress of RR students during the second and third years after the initial intervention to determine if early gains made in RR were maintained over time. The researchers tested the same RR students and comparison students as the initial year on text reading level and writing vocabulary. The researchers found that RR students were still outperforming the comparison students on all measures at the end of each year. The researchers also compared RR students with an average range of text reading level scores for each grade and found that RR students were reading within this average band.

In the Year 1 study (1985-1986) described earlier, the Ohio State group of researchers followed children who received RR intervention during the first full year of implementation to determine their progress one and two years later. Former RR students and comparison students were tested each year on their text reading levels. Mean text reading scores at the end of second grade and third grade showed the superiority of RR students to comparison students. However, when RR students and comparison students were compared in the amount of progress they made in second and third grades, they did not differ. Thus RR students progressed at rates comparable to other low-achieving students who did not have the benefit of the RR program. However, because their text reading levels at the end of first grade were higher, they continued to be higher in second grade and third grade as well. Text reading level scores for formerly discontinued RR students were also compared with average levels for second-grade classrooms in 1987 and third-grade classrooms in 1988. These scores indicated that the text reading level of the groups of discontinued students remained within the average range for their age cohorts. However, both of the scores comparing the RR students with comparison students and the average band should be interpreted with caution, since neither of the outcomes was statistically significant.

DeFord, Pinnell, Lyons, & Place (1990) completed a further follow-up study for this same sample of children in fourth-grade. In this follow-up study, the researchers again examined how former RR students maintained their reading gains into the fourth grade. During this study it was necessary to test a randomly selected sample of fourth-grade RR students due to the limited number of original RR and comparison students who were located. The researchers concluded that RR students were still far ahead in text reading than the comparison students by the end of fourth grade. They also found that RR students who had successfully been discontinued from the program were reading within the average band for fourth-grade. The researchers also found that former RR students were excellent spellers, producing closer conventional spellings on a fifth-grade spelling test than the students in the average random sample.

In the study by Pinnell et al. (1994) comparing RR with three alternative programs described earlier, gains were assessed not only at the end of the field study in February but also at the beginning of second grade. The researchers determined if there was any sustained impact from the four different programs on into the following year. The researchers found that RR had sustained significant effects on text reading and small, but nonsignificant, effects on the dictation task. The effects that were significant at the end of the field study in February of first grade for the partially trained teachers using the RR model had disappeared by the beginning of second grade. The researchers did not use standardized tests of reading achievement during this follow-up assessment. The results appeared to indicate that RR in its traditional form had some advantages over the other forms of early intervention from the beginning of the study on into the second grade.

The stability of RR gains was also examined by the Baenen et al. (1997) study, which was described earlier under the effectiveness of the program. In this study, the researchers used data collected from students served in the RR program over a four year period (1990-1994). The researchers had two questions related to maintenance of learning gains: "Does RR affect students' needs for special assistance after first grade? Do students who are successful in RR stay at grade level in reading after first grade" (p. 164)? In finding an answer to their first question, the researchers compared retention in grade, special education, and Chapter 1 service rates of similar low achievers who were not served by RR. In 1990-1991, the researchers randomly assigned half of the low-achieving first graders to either RR or a control group. The researchers found that RR may have had some positive impact on students' need for retention or Chapter 1 reading services in second grade. However, by third grade this impact was no longer apparent. The RR students served in 1990-1991 (first grade) compared to the control group were just as likely to be retained, placed in special education or served by Chapter 1 in reading two years later.

Baenen et al. (1997) used a standardized reading test in order to answer their second question about the long-term effectiveness of RR. In comparing the third-grade performance of all students served by RR to all students in the control and comparison groups, the researchers found that there was no statistically significant difference in the percentage of students able to score at grade level. During the 1990-1991 year, 28% to 32% of the RR students and 30% to 34% of the comparison students scored at grade level in third grade. The researchers concluded "that it is difficult for any one intervention (especially a pullout) to have long-term impact unless classroom teachers effectively reinforce and build on the intervention" (p.174). Because the researchers did not use the Clay Observation Survey in third grade, they thought that it was impossible to ascertain whether or not the RR students had maintained the specific skills learned through RR.

Collins and Stevens (1997) reported on a study that the Wareham, Massachusetts school district conducted four years after fully implementing the Reading Recovery program. This district examined the sustained effects of RR on students who had been successfully discontinued from the program. Using outside researchers from the University of New Hampshire and the New Hampshire Department of Education, Collins and Stevens began their study by posing two questions: "Do successfully discontinued Reading Recovery students continue to read in the average band of their classmates by the time they reach third or fourth grade? Do successfully discontinued Reading Recovery students require additional reading interventions after first grade" (p. 38)? Using teacher generated ranking lists, the research team divided the students into two-groups: students who had been successfully discontinued from the RR program in first grade, and a group of randomly selected average students who had not received any reading intervention. A number of qualitative measures were used to compare the students, as well as the reading portions of the Stanford Achievement Test (SAT). The researchers found that the RR students did not continue to read in the average band of their classmates as measured on the SAT. They also found that 46% of the students who had been successfully discontinued from the RR program later required additional reading interventions such as Title 1 services, speech/ language therapy, and special education. Given that 46% of the successfully discontinued RR students needed further interventions and given the cost of the program ($100,000-$130,000 yearly), this district decided to adapt RR techniques to use with an unspecified number of children in small reading groups.

Studies Examining the Impact of RR on Teachers and Schools. In a study conducted by Stephens, Gaffney, Weinzierl, Shelton, and Clark (1993), the effects of RR were examined in order to determine how teachers changed as a result of the program. Using interviews and observations with eight Reading Recovery teachers-in-training, data were collected before the training year began, several times throughout the year, at the end of the year, and again during the second year. The researchers searched for patterns in the data and used these patterns to write narratives. The researchers found that the teachers made changes that "looked like evolution, not revolution" (Stephens et al., 1993, p. 14). These constant changes were attributed to RR as well as to other factors, such as readings they had done, conferences they had attended, classes they had taken, observations they had made of their students, and the influence of viewing themselves as researchers who asked questions. The researchers found that this study did not support the popular belief that RR automatically makes better classroom teachers. The researchers found that RR did not prepare first-grade teachers to teach reading in the regular classroom. They found that the RR training was able to provide teachers with rationales and prepare them to use detailed, meticulous, and special reading procedures for the lowest achieving students.

Ross et al.(1995), in addition to their comparisons of reading achievement in the RR and Success For All (SFA) programs, also investigated the impact of the programs on school climate and the involvement in and acceptance of the programs by other school personnel. Teacher surveys and interviews were conducted with all first grade teachers at the three school sites. A school climate inventory was also given in order to obtain teacher impressions regarding the educational climate at the school. The researchers found that in the case of RR, the teachers of the RR students voiced strong reactions in favor of the program. Regular teachers at the RR school, who only had surface familiarity with the program, reported that the RR program provided useful instructional strategies and approaches that had filtered down to the regular classrooms. With regards to the SFA program, the researchers found that the teachers perceived the program to be beneficial for their students and liked particular elements of the program, such as the individual tutoring and the 8-week assessments. At one particular SFA school, the school climate results were more positive than those for the RR site, especially in the areas consistent with SFA schoolwide interventions such as shared decision making by faculty and administration. The researchers concluded that based on the data both of these programs have much to offer schools serving low-achieving students.

A third study conducted by Delicio, Yukish, Brown, and Headley (1997) in South Carolina examined the influence of RR on districts, schools, programs, teachers, and students involved in the program. Using data from 701 returned surveys, the researchers found moderate to strong correlations among independent variables (district support, cost effectiveness, staff development, special education, at risk, and program fit) and dependent variables (teacher change, child attitude change, and child reading change). The researchers found that RR influenced more than just the tutored students. They found that RR was reported on the surveys as having a positive impact by enhancing staff development, reducing the need for special education, and improving overall school achievement in a cost-effective manner.

Section Two: Review of Literature Analyzing Design and Methods of the Reading Recovery Research

In this section, a review of the literature analyzing the design and methods of the Reading Recovery research is presented. The review focuses on four areas of concern that have been expressed regarding the Reading Recovery research. The studies will be examined for objectivity, sampling methods, methodology, and research design.

Objectivity. Researchers and evaluators of the RR program have raised concerns over several procedures that exist within the RR organization that may have an impact on data collection and interpretation. One procedure that Gredler (1997) has questioned is the use of RR personnel to administer pre-and posttests to RR students. He has cautioned that this type of testing situation could lead to inflated test scores that influence the program results. However, Gredler (1997) does state that based on the program's extraordinary results in many countries, children are definitely making progress with this program.

Hiebert (1996) has expressed concerns about the fact that evidence of RR's effectiveness is only collected, analyzed, and interpreted from inside the RR organization. Hiebert (1996) believes that this practice results in inflating the program's results because means for successful children are reported, while data are excluded for students who are unsuccessful or who complete the program after April.

Sampling. Researchers have pointed out another problem that is inherent with the Reading Recovery program that affects data collection and results. Shanahan and Barr (1995) think that there should be more systematic evidence included in research reports on RR students who fail to complete the program because they represent a substantial portion of the students who receive service (approximately 26%). Shanahan and Barr note that, in order to evaluate the amount of learning that RR generates and provide a more accurate estimate of the total effects, all students receiving RR instruction should be taken into account in the evaluations. By omitting children who have poor attendance or who do not progress successfully in the RR program from evaluative studies, a substantial bias is created in favor of RR gains. The broader issues must be addressed, such as why students may not be receiving a full program, what effect RR has on all students in the program, and how does this relate to the overall cost benefit of the program. If all students are not being systematically reported on, then may there not be some substantial hidden costs?

The problem of omitting children from data analysis can be seen in several of the previously described studies. In the Collins and Stevens (1997) report, this problem was apparent when the researchers found that only 64 percent of the students who had participated in the RR program were successfully discontinued. This is substantially lower than the 80 to 90 percent that had been reported by the RR officials who had monitored the program in Wareham, Massachusetts. The researchers found that the rates were lower when they accounted for all of the students who had participated in the program, not just those students who had discontinued or received a full program of 60 lessons or more.

In the Pinnell et al. (1988) longitudinal study described earlier, about 30% of the original sample of low-achieving students assigned to RR had failed to benefit from the program (Center et al., 1995). This became apparent in the Pinnell et al. (1988) study when the data were analyzed for all the students served by the program.

This problem again resurfaces in the previously mentioned Pinnell et al. (1994) study that evaluated how RR compared to three other early intervention programs. In this study, no information was presented on the numbers of students who had withdrawn from the program or on students who were not successfully discontinued from the traditional RR group.

Methodology and Research Designs. Many critics have debated the methodologies and research designs that have been used with some of the Reading Recovery studies. In his commentary on the Pinnell et al. (1994) study, Rasinski (1995) has cautioned that there were extraneous variables in the study that were not controlled for nor commented on by the researchers. Rasinski (1995) stated that the differences exhibited between the instructional groups may not have been attributed to just the nature of the instruction. Other variables, such as expertise of teachers, time for instruction, actual use of instructional time, and the effects of differential instructional grouping may have also been responsible for some of the differences between RR and the other treatments. Rasinski (1995) thinks that, because these variables were not taken into account, the conclusions drawn from the Pinnell et al. (1994) study are limited.

Shanahan and Barr (1995) caution that almost all the studies regarding RR do not take into account the effect that regression to the mean has on data results. Regression to the mean, a statistical phenomenon, is a readily apparent problem in the evaluation of programs that are designed to assist the lowest-achieving students. As Shanahan and Barr (1995) state: "Test score improvements not linked to learning are likely to occur when students with extreme scores are selected for participation" (p. 967-968). Shanahan and Barr also note that the eight children with the lowest reading scores taken into the RR program are not necessarily the eight worst readers. They think that identification of the lowest performing 20% with random assignment to control and intervention groups would reduce the influence of chance gains on assessment measures.

The last methodological flaw that has been reported is in relation to the previously described longitudinal studies (DeFord et al., 1988; DeFord et al., 1990; Pinnell, 1989). Wasik and Slavin (1993) reported that for the longitudinal studies following the Pilot Year (1984-1985) cohort and the Year 1 (1985-1986) cohort, raw scores indicate a difference between RR students and comparison students that remains the same across all three years. However, when Wasik and Slavin (1993) converted these scores into effect sizes (a score for comparing gains and losses between the experimental and control groups across studies), there was a progressive diminution. Wasik and Slavin stated:

> The difference between these two measures is that the standard deviation of the Text Reading Level measure increases each year, making the same raw difference a smaller proportion of the standard deviation. In more substantive terms, the size of the difference may not be diminishing (assuming the measure is an equal-interval scale), but the importance of the difference is diminishing. (p. 185)

Shanahan and Barr (1995) think that these results suggest that by third grade RR students may not be significantly different from comparison students as measured by text reading. Wasik and Slavin (1993) have given the example that a three-month difference in text reading in first grade would be a big difference as opposed to a three-month difference in sixth grade. This seems to be the case with the students' scores from the longitudinal studies conducted on RR.

Reading Recovery has provided a major service to literacy instruction in the United States by promoting a comprehensive program in reading and writing with high-quality intervention standards (Shanahan & Barr, 1995). Nevertheless, early literacy interventions with substantial costs must be studied rigorously in order to provide policy makers with assurances of high quality (Shanahan & Barr, 1995). The research on Reading Recovery has been less than rigorous and substantially flawed, making it difficult to draw distinct conclusions about the program (Shanahan & Barr, 1995). With this in mind, it is important to view the conclusions of the research cautiously.

Conclusions

Research findings have been consistent in demonstrating that RR is an effective program. The studies have shown that RR is effective in helping first grade students learn well-developed reading strategies and that these students tend to learn more than they would had they not received this early intervention program. RR students usually read with average levels of comprehension and accuracy and score higher on outcome measures than other Chapter 1 students. While RR "works," it is not as effective as proponents have claimed. Some children (up to 30%) cannot be discontinued successfully, even after 60 lessons. Another smaller percentage of students either enter special education or are not counted as completing the program, even though these students have received a number of lessons. When comparing RR students to their average peers, the results are mixed. On normative benchmarks or norm-referenced tests, RR students usually fall short of their average peers. However, on other literacy measures, RR students do as well as their average peers.

In comparison studies, RR is more effective than programs that have been modeled after RR. Reading Recovery benefits the students that are directly served by the program. RR is a better alternative than other Chapter 1 programs, but programs such as Success For All may provide service to more low-achieving students than RR. Reading Recovery, however, has been shown to provide students with better reading comprehension strategies than SFA.

The results on the maintenance of gains that RR students make are mixed. Some studies show that significant effects are sustained past the initial intervention (Pinnell et al., 1994); whereas, other studies indicate that once children are brought up to the average range, progress is somewhat less than average of their class (Collins & Stevens, 1997). As Wasik and Slavin (1993) have shown, when raw scores are converted into effect sizes, the actual difference between RR students and comparison students may not be that important. Shanahan and Barr (1995) conclude that stability of gains is likely to be maintained only if students receive classroom instruction that is responsive to the needs of these children. Hiebert (1994) questions the investment that is being made into this program if students do not necessarily maintain gains. Estimates have been made that, after the savings from less referrals for retention and special education due to the implementation of RR, per student annual expenditure for RR is approximately $3,200-$4,000 (Shanahan & Barr, 1995). Shanahan and Barr state that a comprehensive model involving small groups of three to four children reduces the costs of intervention by 50 to 75%, even though these models have not proven as effective as Reading Recovery.

Finally, results from the studies examining RR on teachers and schools are also mixed. RR may have a positive impact on teachers at some school sites; however, other sites show no evidence of improvements in classroom instruction. RR may influence regular classroom teachers if instructional strategies and techniques are shared between RR personnel and their colleagues.

Recommendations

Researchers recommend that RR should continue to be provided for first grade students because it is effective at improving their reading success. RR has been shown to be successful with various kinds of students and compares well with other early intervention programs. This is a program that produces success, especially for students who may only have school failure looming before them. However, in order for Reading Recovery to remain a viable option as an early intervention program, there are several recommendations that need to be considered.

First, there needs to be more articulation between the RR program and the students' classrooms (Baenen et al., 1997). Because RR students do not show strong maintenance of gains past the initial intervention, schools need to ensure that students continue to perform within the average range of their classes. With this in mind, schools may consider forming intervention teams comprised of RR teachers, classroom teachers, and other primary level teachers to monitor the progress of students who were once considered at risk for reading failure (Baenen et al., 1997). Shanahan and Barr (1995) recommend that RR students be given some kind of additional maintenance support in later years.

Second, the RR organization needs to be more open about its data collection, analysis, and interpretation (Hiebert, 1996). Results about *all* students receiving RR instruction need to be provided to the public and to researchers, so that future research can take an objective look at the effects of the program (Shanahan & Barr, 1995). By providing information about *all* students served by the program, RR personnel can evaluate and modify the program to reach more students. This may mean extending the program on into second grade in order to provide more students with a full program of 60 or more lessons (Shanahan & Barr, 1995).

Third, all supporters of RR need to continually consider variations of the program, with the possibility of further enhancing student learning or efficiency (Ross et al., 1995; Shanahan & Barr, 1995). A favorable consideration would be to provide RR in a context where all the other low-achieving students are also being served with strong literacy programs (Ross et al., 1995). By studying these variations, a better understanding may develop of how to make early interventions more effective for the most number of students and provide greater maintenance of initial gains. It is appropriate to continue to allocate funds in support of Reading Recovery. It would be unwise, however, to accept this program as the only appropriate intervention for students who have the greatest potential for success.

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Learning to Move and Moving to Learn

Robin D. Reese

Research has found relationships between physical development and other areas of development in children. This article presents an overview of these interactive relationships and answers the following questions: Why is movement important? How does it contribute to learning? What should kindergarten children learn in physical education? Which traditional games and activities are inappropriate and why? How should lesson plans be structured? What teaching strategies are recommended? What are the physical education content standards and corresponding objectives for kindergarten children? Finally, what are the inevitable results of denying a child access to quality, daily physical education in elementary school?

The Physical Education Framework for California Public Schools, Kindergarten through Grade Twelve, is based on the premise that the quality and productivity of a person's life can be enhanced through participation in a comprehensive, sequential, physical education program that promotes physical, cognitive, emotional and social well-being (California Department of Education, 1994). These learning domains are interactive and affect each other as they contribute to the development of the "whole" child. This article presents an overview of the relationships among physical, cognitive, emotional, and social development and then describes what kindergarten children should learn in a quality physical education program. The discussion also includes an examination of why some physical activities are inappropriate. Teaching strategies are recommended, and the article concludes with a look at content standards and objectives.

The Relation of Physical Development to Cognitive, Affective, and Social Development

Movement influences all facets of development (Gallahue, 1995). Much of the learning that occurs in early childhood is through movement experiences. In studies where children spent time in daily physical activity, researchers found a higher level of academic success (Hannaford, 1995). Children retained knowledge longer if they connected emotionally and physically to the material. Other studies showed a correlation between body-space awareness and paper-space awareness (Corso, 1993). For example, when Corso asked 3- to 8-year old children to touch their shoulders, some touched only one shoulder.

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Similarly, some children, when asked to jump and touch the ceiling, reached only with one hand. After requesting samples of their papers, Corso discovered the quadrant of paper space not used in writing and coloring was the same quadrant of body space not used.

Children who are provided with opportunities to learn basic movement skills and experience the benefits of being physically fit in an emotionally safe environment are more likely to develop and maintain a healthy active lifestyle. Children must derive enjoyment from physical activity if they are to continue participating. To this end, children must eventually become proficient in a variety of movement skills. Kimiecik, Horn and Shurin (1996) determined that the best predictor of exercise behavior in children was perceived competence. Children who felt good about their fitness abilities were more likely to participate in health-enhancing activities. As children get older and more concerned with peer approval, they will participate willingly in recreational, sport or fitness activities only if they have an adequate level of perceived skill competence. Children who do not perceive themselves as skilled will avoid physical activity at all costs, in an effort to preserve their self-esteem. Teachers must take advantage of the "critical periods" when children love to move and love to practice skills, without concern for peer approval (ages 3-8), to engage children in vital programs that promote their health and well being.

In relation to social development, there is no better curricular area in which to teach courtesy, respect, responsibility, helping, acceptance of differences, encouraging, complimenting, conflict resolution and a myriad of other social skills than in a physical education class. Many classroom teachers implement successful social skills programs in their classrooms, yet are shocked to witness anti-social behavior from their children at lunch or recess. Children often do not make a connection between the behavior they have learned to demonstrate within the safe confines of the classroom and the behavior they see or believe is expected outside.

In quality physical education programs, kindergarten children learn to move through space without bumping into others. They learn to respect the space of others and to demonstrate courtesy by saying "sorry" or "excuse me" when another's space is violated accidentally. Young children soon learn that it is not okay to kick someone else's ball across the playground when it rolls into their space by mistake. Instead, they are taught to stop the rolling ball and roll it back to the owner, who is then expected to say "thank you." In physical education, mistakes can be very obvious and visible for all to see because of the physical nature of a child's response. Children learn that it is not polite or kind to laugh at someone who is experiencing difficulty or who makes a mistake. They learn that put-downs are not acceptable, and they begin to build a positive vocabulary that is full of encouraging words and compliments for their classmates.

Many movement activities for young children involve working cooperatively with a partner or alongside others in small groups. Children find satisfaction in being a part of a group and experience sadness when others reject them. Thus, children must be encouraged to accept all of their classmates and play willingly with any one of them at any time. Cooperation must be taught prior to competition since competition is impossible if people choose not to cooperate and follow the rules. While children enjoy working and playing with other children, conflicts are bound to arise. Children must learn how to take responsibility for solving their own problems in socially acceptable ways, and they can do so with proper guidance.

Physical Development

Gallahue (1995) suggests that teachers often assume children somehow automatically develop their movement skills as a result of maturation or simply by participating in a variety of activities. This is not true. Teachers must use the early years to help children master basic locomotor, nonlocomotor and manipulative (object handling) skills. In addition, concepts of space awareness, effort, relationships, and body awareness should also be introduced. Time should be set aside each day for children to explore, practice, develop, and refine these concepts and skills.

Practice time for movement concepts and skills could take several different forms, but should be based on developmentally appropriate practices (NASPE, 1992 and 1994). Paramount among these practices is "maximum participation"— most of the children moving most of the time. Children learn when they are actively engaged in the subject matter, when they are on task, and when they are succeeding at about an 80% success rate (Rink, 1998). Circle games such as "Duck, Duck Goose" that have two children active and the rest inactive do nothing to contribute to learning in the physical domain. Tag games or dodge ball games that eliminate children, as well as relays that involve waiting in line for a turn, highlight the athletically gifted children and prevent those who need the most practice and encouragement from getting these important components of physical education. Relays do nothing to improve basic skill development because of the speed factor, and children who are not innately able to run very fast are often accused of "making their team lose." This certainly places a young child's self-esteem in jeopardy and can make him or her dread PE. Such stereotypical and traditional physical education activities must be modified or removed from physical education programs. These activities do not support the principal theme or philosophy of California's physical education framework. The framework is based on the premise that "all children–regardless of disability, ethnicity, gender, native language, race, religion, or sexual orientation–must be given opportunities not only to succeed in physical education but to develop a lifelong commitment to the pleasure and health benefits of physical activity" (California Department of Education, 1994, p. 2).

Physical Education for Kindergarten Children

A quality physical education program for kindergarten children begins with establishing a positive learning environment. Children need to know what to expect and what is expected from them. Teachers must "set the stage" for proper behavior the way they do in their classroom. Rather than a list of rules, teachers are encouraged to try a "PE Motto" of "Respect and Responsibility." Although the motto may appear to be too abstract, teachers will find that these two words are inclusive of any rules they have ever had. Every single inappropriate behavior one can think of violates respect and/or responsibility. Throughout the course of the school year, the children will clearly come to understand the meaning of these two words if the teacher relates what the children do to respectful and responsible behavior. Children must also be given opportunities to practice routines and protocols for starting and stopping activity, getting and returning equipment, putting equipment down on the stop signal, selecting partners quickly, etc.

Teaching physical education is harder than teaching in the classroom because of the increased space and distractions. Too much space is overwhelming for children, and teachers do not want them roaming so far that they can no longer hear. One of the first things a teacher needs to do, therefore, is to clearly mark the boundaries within which they will move (general space) with paint or playground chalk, or use existing painted lines on the hard surface area (large circle, volleyball court or half a basketball court). Kindergarten classes often have their own playground, and the hard surface area is perfect for general space. Painting stars in a scattered formation inside general space enables children to find their own personal space or self-space quickly. This area becomes one in which they can move without touching others. Stars are recommended because all of the children should be "stars" in physical education class.

Movement activities at the beginning of the program are focused on moving in self-space, moving through general space while staying inside the boundaries, avoiding collisions, and stopping quickly on an audible stop signal (two beats on a tunable hand drum make an excellent stop signal). On the stop signal students should be expected to stop moving, stop talking and face the teacher. If they are working with equipment, it should be placed on the ground in front of them. If it is a ball, it should be placed securely between their feet. It is not unreasonable to expect the students to stop, look and listen within three seconds. A teacher should only have to give the signal once. Naturally achieving this response will take time, practice and positive reinforcement.

Once a teacher has established a positive, productive environment for physical education, learning can truly begin. One suggested structure for a kindergarten class (Reese, 2000) includes: (1) warm-up activities; (2) less vigorous, nonmanipulative activities, and (3) object handling activities. Begin the class with a vigorous locomotor/space awareness activity in general space. Have the children walk, jog, jump (land simultaneously on two feet) and hop (transfer weight from one foot to the same foot or from two feet to one foot) while moving forward, backward and sideways without going outside the boundaries of general space or bumping into anyone. Encourage the children to run and leap over hoops or carpet samples, to gallop forward and backward, slide from side to side and eventually skip forward through general space. Kindergarten teachers need not be concerned if children cannot skip. Many five-year-olds are not developmentally ready, but they can learn how to jump individual ropes and long ropes. Recorded songs that reinforce the locomotor skills or simple dances can also be used successfully in this section of the lesson plan.

The locomotor warm-up should be followed by a less vigorous nonmanipulative or imagery activity. This second portion of the lesson might focus on movement concepts:

The Body and Relationships
- Identification of body parts
- Relationship of body parts to others
- Body shapes
- Body leads
- Body relationships to objects
- Body relationships to people

Space Awareness
- Self-space
- General space
- Directions
- Levels
- Pathways
- Range or Extensions (distance, size, etc.)

Effort
- Time (speed, rhythm, sustained vs. percussive, acceleration vs. deceleration)
- Force
- Flow

This portion of the lesson might also focus on themes. A teacher could present a theme such as the circus, a day in the park, or visiting the fire station. Exploring movement narratives that reflect well-known themes or the roles and responsibilities of people found in specific environments will enhance a child's movement vocabulary and increase their knowledge of the world in which they live(Clements, 1995).

In addition to movement concepts and themes, this portion of the lesson could also give students an opportunity to explore nonlocomotor skills such as bending, stretching, reaching, turning, dodging, curling, twisting, etc. Or, it might focus on balance and/or tumbling activities.

The third portion of the lesson focuses on manipulative skills (object handling skills). During the first several weeks, students should be allowed to play with the equipment without having to focus on a specific skill or task. When they begin to tire of free exploration, object manipulation can focus on manipulative skills such as ball rolling, underarm throwing/volleying/striking, bouncing, dribbling, overhand throwing/striking, striking objects at low levels with long handled implements (hockey sticks, pilo-polo bats, croquet mallets, golf putters), kicking, or sidearm throwing/striking/batting.

Music and rhythm experiences need to be incorporated into at least one component of the lesson each day. Young children learn best when activities presented to them are changed frequently. A key to being successful in teaching movement to young children is to provide a number of activities each day during physical education class and repeat the activities frequently during the year. Doing so is consistant with the philosophy of the physical education framework, which states that every child "can develop appropriate skills, feel good about his or her body and relate to others in positive ways" (California Department of Education, 1994, p. 6).

Teaching Strategies

Another "key to success" for teaching movement to young children is to utilize teaching srategies that promote creativity rather than conformity. For children, creativity means no single right answer. This interpretation translates into feelings of success and mastery that raise self-esteem and allow children to feel they have an effect on their environment. Here, then, teachers must value process over product. A movement program that requires the children merely to imitate the instructor will do nothing to foster creativity. But a program of movement exploration, with emphasis on problem solving, discovery and self-expression, can make a substantial contribution. Also, when a teacher praises and validates their various responses, children will realize that individual solutions are okay and that they are not competing against one another. Thus, their confidence will grow, and they will continue to take greater creative risks. With the right balance of freedom and structure, a physical education program can nurture creativity and still provide students with the solid foundation needed for a healthy, active life. A sample lesson plan that utilizes the structure recommended in this article follows next.

Sample Physical Education Lesson Plan for Kindergarten*

GRADE LEVEL: Kindergarten
CLASS SIZE: 20
LESSON FOCUS: Skipping; Body levels; Object levels
FACILITIES: hard surface area with general space boundaries and self-space markers clearly defined with chalk or paint
EQUIPMENT: Portable Tape/CD Player & music; 20 Streamers; 4 Hula Hoops
TEACHING STYLES: Practice and Divergent Production

OBJECTIVES:

Physical

Students will be able to skip through general space in a forward direction individually and while holding hands with a partner to the best of their ability while staying inside the boundaries and avoiding collisions.

Students will be able to make different shapes with their bodies at high levels, medium levels and low levels, as well as move through general space in different directions with their bodies at each of these levels.

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*Portions of this lesson are taken from Reese (1992)

Students will be able to manipulate streamers at high, medium and low levels in self-space and while moving through general space in different directions.

Affective

Students will be able to demonstrate creativity by making a variety of different shapes at high, medium and low levels, moving through general space in different ways at each level and manipulating streamers in various ways at each level.

Cognitive

During closure, students will be able to correctly identify teacher demonstrations of high, medium and low levels with a choral response.

LOCOMOTOR SKILL DEVELOPMENT

(Review walking, jogging, jumping, galloping and sliding through general space. Then introduce skipping.)

- Let me see you skip through general space without bumping into anyone. GO! (*Accompany the skipping with an uneven rhythmical beat on a tunable hand drum*).

- Take someone's hand and skip through general space with a partner. (*Skipping is very rhythmical and children need to "feel" the rhythm. Skipping with someone who knows how really helps. Since many of the kindergarten children cannot skip yet, change partners often in hopes that those who do not know how to skip will eventually pair up with someone who does. The teacher should join in, take turns skipping with as many children as possible, and continue to play music to accompany the skipping.*)

- (*Stop Signal*) When I say go, find a new partner to skip with. GO! (*Repeat seveal times.*)

MOVEMENT CONCEPTS

Self-space challenges – body levels

- When I say go, I'd like to see everybody standing on their own star. GO!

- Today we are going to explore the different levels that we can move our bodies at in self- space and while moving through general space. When you are standing on your star in your own self-space, like you are right now, your body is at a high level.

- Let me see you make an interesting shape with your body at a high level.

- Make a new shape with your body at a high level. See if you can make a third shape at a high level that is different from your first two shapes. *(Reinforce those with* *unique shapes and praise their creativity.)*

- Let me see you find a way to get your body higher in your self-space. (*Most children will stand on tiptoe and raise their arms above their heads. Reinforce correct responses that you see, but keep encouraging them to get even higher until someone discovers jumping. Reinforce the idea that jumping gets our body to the highest level possible unless we have something to climb on.*)

- Now let me see you get your body as low as possible in your self-space. (*At first, due to the hard surface area, they may hesitate getting really low. Keep encouraging them to get lower until someone lies down on the ground. Immediately begin a stream of positive reinforcement so that more children follow.*) Let me see you make an interesting shape at that low level.

- Let me see you make a wide shape at a low level.

- Try making a twisted shape at a low level.

- Show me a narrow shape at your low level.

- If I asked you to put your body at a level between high and low, what do you think that level would be called? (*medium or middle*) Let me see you put your body at a medium level in self-space. Find a different way to be medium. Find still a third way to be medium. (*Continue to reinforce different responses. You are attempting to reinforce creativity rather than imitation or conformity. Make sure you are NOT demonstrating unless you are working with children who do not understand English. If you do have nonEnglish or limited English speaking children, you will have to demonstrate, which will eliminate creativity but will teach them a movement vocabulary in English.*)

General space challenges – body levels/directions

- Let me see you move through general space with your body at a high level. Find a different way... a different way. (*Reinforce with specific feedback all the acceptable responses you see. It is important that the children begin to think and respond creatively, rather than searching for that “one right answer” for which they believe the teacher is looking.*)

- Let me see you move through general space backward with your body at a high level. Remember to look over your shoulder and watch where you are going so you don't bump into anyone. Find a different way.

- Let me see you slide sideways. See how high you can get in the air as you slide. Try sliding sideways the other way.

- Let me see you move through general space at a low level. Find a different way to move at a low level...a different way, etc.

- Let me see you move backwards at a low level. Find a different way.
- See if you can roll sideways with your body long and narrow like a pencil and your arms straight up over your head. This is called the "log roll" and it is a great way to move sideways at a low level.
- Let me see you find a way to move through general space with your body at a medium level. Find a different way.
- Try moving backwards with your body at a medium level. Find a different way.
- Try moving sideways with your body at a medium level. Find a different way.

MANIPULATIVE SKILL DEVELOPMENT

Self-space challenges – object levels

- When I say go, you may go to the closest hula-hoop, select one streamer, take it back to your self-space and explore with it. GO! (*Play music as the children explore.*)
- Let me see you move your streamer at a high level. Find a different way. Put your streamer in your other hand and try moving it in a way you haven't tried yet. Find another way. (*Continually reinforce unique responses with positive specific feedback and continue to play quiet music as long as the children can still hear you.*)
- Move your streamer at a low level. Find a different way. Try it with your other hand. Find a different way to move it.
- Try moving your streamer at a medium level. See if you can move it at a medium level behind your body. Move it at a medium level in front of you. Try moving it on one side of your body. Put your streamer in your other hand and try moving it on the other side.

(*Note: You may need to instruct the children to perform periodic "knot checks" on their streamers. Make them responsible for removing the knots, as needed.*)

General space challenges – object level/directions

- Move through general space with your streamer at a high level. Find a different way. Try moving backward, keeping your streamer at a high level. Try sliding sideways and waving the streamer back and forth above your head as you slide. Find a different way to move sideways with your streamer at a high level while using your other hand.
- Move through general space with your streamer at a low level. Find a different way to move it at a low level. Change hands. Move backward while moving your streamer at a low level. Move sideways with your streamer at a low level. Try

it moving sideways the other way with the streamer at a low level in your other hand.

- Move through general space with your streamer at a medium level. Find a different way to move your streamer at a medium level. Change hands, move backward and move your streamer at a medium level. Find a way to go sideways while moving your streamer at a medium level. Put the streamer in your other hand and go sideways the other way while keeping the streamer moving at a medium level.

- When I say go, roll your streamer up nicely and place it back in the hoop you got it from neater than you found it and then meet me in the listening area. GO!

CLOSURE

- I am going to demonstrate some body movements in self-space or in general space and I want you all to call out what level you see me moving at.

For additional lesson plans and specific activities that are developmentally appropriate and employ many different teaching strategies, the reader is encouraged to utilize the following resources:

Clements, R. L. (1995). *My neighborhood movement challenges.* Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance.

Hammett, C. T. (1992). *Movement activities for early childhood.* Champaign, IL: Human Kinetics.

Hughes, H. H. & Alfonso, R. A. (1994). *Meaningful movement lesson plans: A developmental theme approach to physical education.* Dubuque, IA: Kendall/Hunt.

Joyce, M. (1994). *First steps in teaching creative dance to children.* (3rd ed.). Mountain View, CA: Mayfield Publishing Company.

Logston, B. J., Alleman, L. M., Straits, S.A., Belka, D. E. & Clark, D. (1997). *Physical education unit plans for preschool-kindergarten: learning experiences in games, gymnastics, and dance.* Champaign, IL: Human Kinetics.

Pica, R. (1991). *Special themes for moving and learning.* Champaign, IL: Human Kinetics.

Sanders, S. W. (1992). *Designing preschool movement programs.* Champaign, IL: Human Kinetics.

Torbert, M. & Schneider, L. B. (1993). *Follow me too: A handbook of movement activities for three-to-five-year-olds.* Menlo Park, CA: Addison-Wesley.

Standards and Objectives

Assessment in physical education across the United States is based on national content standards (NASPE, 1995). Assessments take the form of teacher observations, videotapes, checklists, rating scales, cumulative records of fundamental motor skills, progress reports, anecdotal records, scoring rubrics, questions, self-assessment tasks, event tasks (i.e., students draw a picture of a movement sequence and then perform the sequence), and standardized gross motor development tests. Following is a presentation of the national standards (NASPE, 1995, p. 1) and corresponding benchmarks or objectives for kindergarten children (Chepko & Arnold, 2000, pp. 7-15). The national standards appear in italics and the objectives are listed below each standard.

A physically educated person:

1. *Demonstrates competency in many movement forms and proficiency in a few movement forms.*
   - Demonstrates creative body shapes
   - Demonstrates moving to various rhythms
   - Demonstrates forward rotational skills (log roll, egg roll, shoulder roll, forward roll)
   - Attempts climbing, supporting and balancing skills on various apparatus
   - Demonstrates moving at various levels.
   - Demonstrates the nonlocomotor skills of stretching, twisting, curling, bending, holding, lifting and swaying
   - Integrates turning with locomotor skills
   - Demonstrates walking, running, jogging, sliding and jumping
   - Demonstrates nonlocomotor and manipulative skills in combination
   - Demonstrates locomotor and manipulative skills in combinations
   - Attempts the locomotor skills of skipping, hopping, leaping, and galloping
   - Attempts kicking, throwing, catching, striking, swinging, pushing and pulling

2. *Applies movement concepts and principles to the learning and development of motor skills.*
   - Demonstrates an understanding of general and personal space (where the body moves)
   - Demonstrates the concepts of directionality and laterality (relationships)
   - Demonstrates an awareness of spatial relationships between self, others, and objects
   - Demonstrates variations in force/effort (how the body moves)
   - Describes a movement in terms of level and tempo (speed/flow)
   - Locates the major parts of the body
   - Solves movement-related problems

3. *Exhibits a physically active lifestyle.*
    - Participates fully in all class activities
    - Participates outside of class in self-selected movement experiences
4. *Achieves and maintains a health-enhancing level of physical fitness.*
    - Participates in anaerobic activities
    - Participates in activities requiring appropriate levels of muscular strength/endurance
    - Demonstrates flexibility
5. *Demonstrates responsible personal and social behavior in physical activity settings.*
    - Starts and stops on command
    - Maintains his/her personal space
    - Follows simple directions
    - Follows a series of instructions for an activity
    - Participates in activity without arguing
    - Accepts responsibility when asked by the teacher
    - Demonstrates cooperative skills
6. *Demonstrates understanding and respect for differences among people in physical activity settings.*
    - Demonstrates respect for individuals
7. *Understands that physical activity provides opportunities for enjoyment, challenge, self-expression, and social interaction.*
    - Creates a sequence of nonlocomotor movements
    - Develops self-confidence in a physical activity setting
    - Explores his/her physical capabilities

Children who are provided with opportunities to learn basic movement skills and experience the benefits of being physically fit in a positive and emotionally safe environment are more likely to develop and maintain a healthy active lifestyle. Learning to move and moving to learn are vital in a child's world. Physical education provides the opportunity to use a child's natural instincts for movement and play to teach anything deemed important in the scope of an appropriate education. Human movement is the essence of childhood, the means of emotional expression and a vehicle for work and play. Movement is also an instrument of discovery – of our environment and of ourselves. A child's perception of self is often based on the ability to accomplish movement tasks and to solve movement problems. As Gallahue (1995) states: "To deny children the opportunity to reap the many benefits of regular vigorous physical activity is to deny them the opportunity to experience the joy of efficient movement, the health benefits of physical activity, and a lifetime as confident, competent movers" (p. 125).

Note: Teachers in California who seek professional growth experiences that might enable them to provide better physical education experiences for the children they teach are encouraged to attend: (1) the annual state conference of the California

Association for Health, Physical Education, Recreation and Dance (CAHPERD), held in March of each year and/or (2) the Cal Poly Elementary Physical Education Workshop, held in August of each year. For information, call CAHPERD at 916-922-3596 or 1-800-499-3596 or e-mail: cahperd@aol.com

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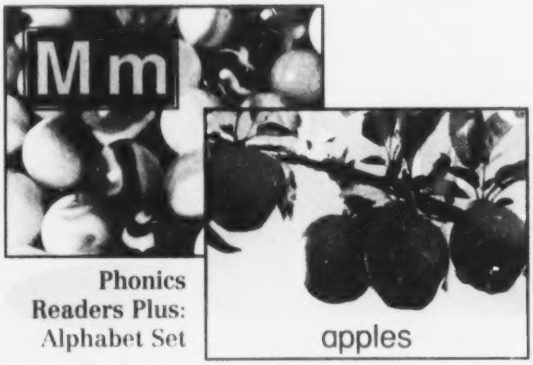

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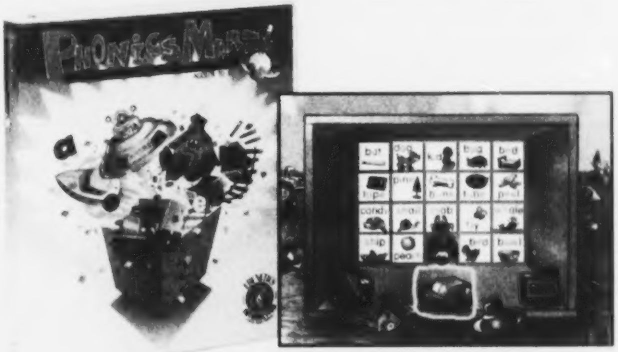

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